

INDIA

(An Economic and Regional Survey)

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PREFACE

The complete publication of this volume has been considerably delayed due to some unforeseen and tragic events. The authors and the publishers regret the same.

Originally we had meant to have India and Asia in the one and the same volume, but their separation has now been necessitated owing to the changes in the syllabus brought about by the newly elected Board of Studies in Geography, Punjab University.

An attempt has been made in this volume to treat India in complete details, a venture which has never been attempted, we regret to add, by any Indian. We hope our attempt, howsoever incomplete and defective it may be, will be useful for those College students who had been greatly handicapped owing to the absence of a single complete work on India.

Most of the matter in this connection has been taken from books official reports and journals of all kinds. It is well nigh impossible to name and adequately thank all the people and agencies from whose works we have freely drawn. Occasional acknowledgements occur, however, in the text.

Friday

Our special thanks are due to Dr. Rajnath of Benares, Dr. S. P. Chatterji of Calcutta, Dr. Pithawala of Bombay, and Prof. George Kuriyan of Madras for the valuable suggestions made and for giving us valuable information as to suitable references about some topics. Prof. Kuriyan's and Dr. Chatterji's works have been a great help in the preparation of this volume and for this we tender our thanks. On one occasion we also consulted Dr. R. D. Tewari of Khalsa College, Bombay and he very willingly solved our difficulties. Mr. G. C. Awasthy's *Tea Industry* has also proved useful. We must not forget to tender our gratitude to Dr. K. S. Ahmed and Dr. L. Dudley Stamp whose brilliant writings have been a constant source of help and inspiration to us during the preparation of this volume.

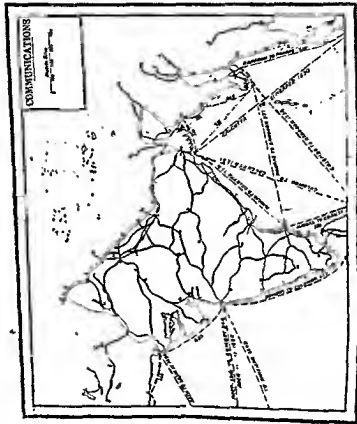
In presenting this book to teachers of geography in India we beg to crave their indulgence for any mistakes in expression or facts which may kindly be pointed out to us. There are also some misprints, some of them quite silly.

The printing and the get-up of the book are also not quite upto the mark, but the difficulties of a post-war era can hardly be exaggerated.

LAHORE.

M. NAZIR

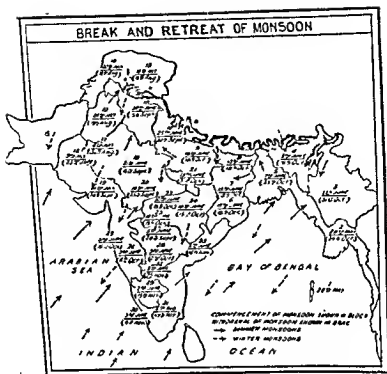
V. S. MATHUR.



Railways, Rivers and Ocean Routes

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(Adapted from a similar map issued by the Meteorological Deptt.)

1. Bay Islands. 2. Lower Burma. 3. Upper Burma. 4. Assam. 5. Bengal.
6. Orissa. 7. Chota Nagpur. 8. Bihar. 9. United Provinces-East. 10. United Provinces-West.
11. Punjab, East and North. 12. Punjab, South and West.
13. Kashmir. 14. N.W. Frontier Province. 15. Baluchistan. 16. Sind.
17. Rajputana-West. 18. Rajputana-East. 19. Gujrat. 20. Central India, West.
21. Central India, East. 22. Bessr. 23. Central Provinces, West. 24. Central Provinces, East.
25. Kon Kan. 26. Bombay, Deccan. 27. Hyderabad, North.
28. Hyderabad, South. 29. Mysore. 30. Malabar. 31. Madras, South-East. 32. Madras, Deccan.
33. Madras Coast, North.

INDIA

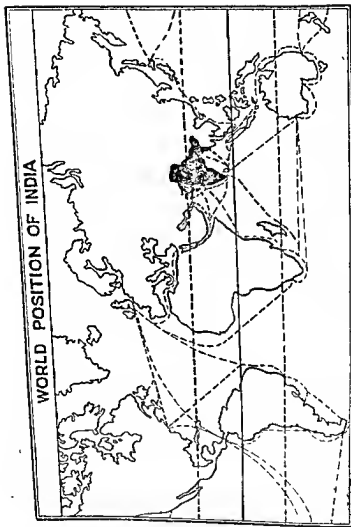


Fig. 1.

CHAPTER I

INTRODUCTION

India is a vast country—about 1·6 million square miles in area—occupying a southern position in the continent of Asia. Fig. 1 shows that India is entirely north of the equator extending from about 8° to about 37° N—her longitudinal extent being between 61° and 97° E.

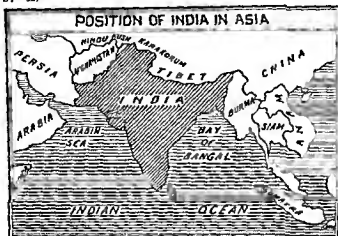


Fig. 2.

The northern system of mountains that isolates India from the rest of the continent of Asia is difficult to cross except through the -

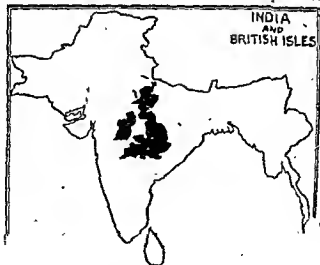
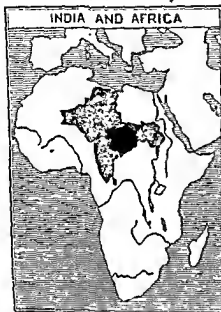


Fig. 3.

Khyber and Bolan passes in the north-west, a fact that is manifest from History. As we shall learn later on, these mountains also have a marked influence on the climate of the country.

India is a huge country so much so that many persons prefer to call it a sub-continent. Figures 3 and 4 give some idea of her size. Her area is equal to that of Europe excluding Russia—British Isles being only equal to some of the Indian provinces in area. The area of our country is about one sixth that of Africa,



the second largest continent in the world. The size of an average Indian district is about 4,000 sq. miles and some of our bigger districts like Mymensingh (Bengal) and Vizagapatam (Madras) are larger in size than the European countries of Denmark, etc.

India is as much broad as she is long. Her greatest width from east to west is about 2,200 miles and her greatest length from north to south is about 2,000 miles.

The length of Indian coastline is only about 4,000 miles, a figure which is quite insignificant when compared to the size and magnitude of the country. The coasts of India are compact and straight, thus giving her only a very small number of good

Fig. 4.

ports. A comparative study of the British and the Indian coasts does not speak very highly of India.

India contains a huge population within her boundaries, so much so that if all the people of the world were made to stand in a line, roughly one man in every $\frac{1}{10}$ will be an Indian. Although India occupies only about 3.4 per cent of the area of the world, she claims about $\frac{1}{10}$ of the entire world population. According to the 1931 census India was a close second to China in the matter of population, but the 1941 figures gave her the first position.

India has a great variety of religions, languages and customs so much so that every region stands out as a separate entity quite different from the others.

A sub-continent. Are we justified in calling India a sub-continent? The answer is not difficult to give. India is a geographical

unity and her boundaries both on land and sea are so well marked that she can be easily sorted out as a separate unit. Though she is a part of Asia, she has greater claims for being called a continent than Europe at least as far as physical boundaries are concerned. The high and almost impregnable wall of the Himalayas in the north and the broad expanse of deep ocean in the south are reasons enough to further our claims. Her climate, religions and culture show sharp differences with those of her neighbours—much more than the peoples of the various European countries.

The Political Divisions of India. Formerly Burma was also included in India as a province but it was separated by the Act of 1937 and now forms an independent part of the British Empire. The governor is appointed directly from London. Ceylon, in the south is an island colony and makes a part of the British colonial Empire. She is directly connected with the colonial office in London.



Fig. 5.

The supreme authority in India is the viceroy who assists the king and the cabinet. The viceroy and his ministers have Delhi as their winter capital and Simla as the summer capital. Some parts of India are ruled by native kings but they are finally under the Crown. India is divided into eleven provinces.

1. North-western Frontier Province. 2. The Punjab. 3. The Sindh. 4. The United Provinces. 5. Bihar. 6. Orissa. 7. Bengal. 8. Assam. 9. Central Provinces. 10. Bombay Presidency. 11. Madras Presidency.

There is a Governor in each province. He has ministers to assist him. The two legislative bodies frame laws. They are elected by the people.

12,000 ft. to 15,000 ft. The outer Himalayas or the Siwalik ranges are merely a system of foothills with an average height of 3,000 to 4,000 feet.

Between the Siwaliks and the Himalayas there are a number of flat valleys known as the 'Doons'. They are covered with deposits of rock material brought down by the rivers. Here and there we may come across jettings of hill tops that have been buried under the silt.

Encircled within the great Himalayan ranges are two broad valleys* of Kashmir and Katmandu—vast stretches of lowlands intermont from all sides and situated at a height of about 5,000 feet and above are the chief characteristics of these valleys. The origin of these peculiar valleys is attributed to the silting up of some big lakes. The Wuller lake and the Dals near Srinagar are reported to be the remnants of those bigger water bodies.

Glaciers. The Himalayan snow-line is more prominent on the southern slopes of the Himalayas. In the eastern portion of the Himalayas, it is reached at about 14,000 feet, while on the western side it occurs a bit higher at about 19,000 feet. On the opposite side of the Himalayas the snow-line is reached at about 3,000 feet owing to extreme desiccation of land and very low humidity. In the greater Himalayas there are many glaciers fed by the snows of the higher regions. Some of these glaciers are amongst the largest in the world. Their normal size varies from 2 to 3 miles but some of them are reported to be even about 24 miles long. Some of them descend to about 9,000 feet during winter specially in Kashmir.

(b) The mountains of the north-west lie west of the river Indus and consist largely of a series of flanking ranges that mostly lie out of British India. They form the Indo-Afghan and the Indo-Baluchistan frontiers. Kara-Korum and the Hindukush are the dominating ranges of the region. Southwards they are continued by the Sulaiman and the Kirthar ranges. Near the Sulaimans lie the plains of Peshawar, Kohat, and Bannu. These intermont plains are about 1000 feet above the sea-level and resemble the Doons greatly. The Salt Range forms the innermost portion of this system.

These mountains are of simple fold composition. A number of streams cross them from the Afghanistan side and most of the routes follow these river valleys. The valleys usually run from north-east to south-west. Owing to the lack of rainfall, the hills are usually bereft of all vegetation and wind erosion is naturally marked.

(c) The Brahmaputra breaks the continuity of the Himalayas, and the Assam and Burma hills, which though geologically similar to the Himalayas, form a separate sub-division. These eastern hills are rather low and have no broad valleys worth mentioning. The Garo, Khasi, Jaintia and the Naga hills running almost east-west join the chain of the Burma, Lushai and the Arakan hills running north-south. The western slopes of these hills are steep

*These are not river valleys.

but they have gentler slopes on the other side. Some of these ranges are intersected by small plateaus like the plateau of Shillong in Assam. Some of these hills adopt funnel shapes in the south. Cherrapunji in one of these funnels receives perhaps the heaviest rainfall in the world.



Fig. 8. (After Stembridge)

Land Routes. Because of the completeness of this northern mountain wall the few notable passes are of great economic and strategic importance and deserve some attention. Most of the passes are as much high as 17,000 ft. and valley routes are difficult. In the north-west, on the Afghan frontier, the mountains are lower and the passes easier, it is from this direction that India has been invaded again and again. Here lies the most famous of all passes, the Kheyber Pass. It is situated at a height of about 3,400 feet and leads from Peshawar to Kabul in Afghanistan along the valley of the river Kabul. The Bolan between the Sulaiman and the Kirthur ranges and the Gomul leading from the Punjab to Ghazni are also important passes in the north-west of India. In the Himalayas proper one route leads from Darjeeling to Lhasa into Tibet and another from Leh in Kashmir to Chinese Turkistan. Through an eastern offshoot of the Himalayas run a number of difficult routes to Burma, the most important being through Manipur state.

The Tarai is the name given to the 'no man's land' joining the northern mountains and the Indo-Gangetic plains. This is a very wet, unhealthy and undeveloped stretch of land composed of coarse sands and pebbles. Many streams flow as under currents during the dry season. The region abounds in swamps. Historians tell us that the region had a flourishing civilization in historic times. Diggings near Nepal have revealed relics of many medieval Buddhist cities.

2. The Northern Plains lie between the northern mountains and the Southern Peninsula. The average length of the area is about 2000 to 2,500 miles and the average width is about 200 miles, being greater in the west. These plains comprise of northern

Rajputana, the Punjab, portions of Sindh, U.P., Bihar, Bengal and the lower half of Assam.

It is a true, alluvial plain and claims two of the biggest deltas in the world, the delta of the Ganges and the delta of the Indus.

This is the most important part of India and it claims about two-thirds of India's population.

The region presents a flat appearance and even at a distance of a thousand miles from the sea, its height is only about 500 feet. It is only between the Jumna and the Sutlej that the land rises to about 900 feet and forms the water-parting between the two river systems *i.e.* the Indus and the Ganges.

The depth of the alluvium is reported to be considerable. Some borings have been made and it is estimated that the maximum depth may be about 6,500 and the minimum about 1000 feet. The land between the Rajmahal hills and Delhi is reported to have the deepest alluvium.

New alluvium or 'Khadkar' is found near the river banks, while the older alluvium or 'Bangar' lies away from the rivers and contains a good quantity of Kankar. The sub-soil level of the region is high.

3. The southern plateau is triangular in shape and is composed of old, hard, crystalline rocks. The northern boundaries are not well defined and are comprised roughly of the Vindhya (1,500' to 4,000') and other ranges running from east to west. The eastern side is known as the Eastern Ghats and comprises of broken ranges; and the western side is known as the Western Ghats and consists of a compact range unbroken except for three passes namely the Bhore Ghat, the Thal Ghat and the Pal Ghat Gap. These passes have been used for railway routes.

The Satpura line comprising of the ranges of Central India going down to Chōtta Nagpur, has played a very important part in the history of India. It has acted as a barrier to the Aryans and others and it is only in this region that we find pure Indo-Dravidian blood.

The average height of the plateau is about 2,000 feet and it is divided into many plateaus of all sizes. Isolated hillocks are also found here and there, their number being the greatest near about the side hills.

The greatest height is reached in the south and west, and the general slope is towards the east.

The plateau mostly consists of metamorphic rocks. Slates and marbles occur in the north. In the north-west occur lava soils usually called *black cotton-soil*.

The Narbada rift-valley divides the peninsula into two sub-divisions almost triangular in shape—(a) The Malwa plateau in the north and (b) the Deccan. The Malwa plateau is largely broken up in the neighbourhood of rivers. The Deccan is characterised by flat-topped hills. The rivers of the Deccan flow in deep gorges. The

southern most portion of the plateau is called the Mysore plateau and descends abruptly towards the south.

4. The South India plateau is flanked by coastal strips of lowlands on the west and on the east. The Nilgiri and the Cardamon hills physically separate these two strips of coastal plains. These plains are composed of alluvial soil and are agriculturally the most important areas of the south.

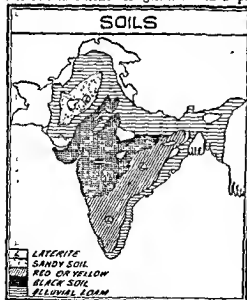
The eastern plains, also known as the Payan Ghats, may be easily divided into (a) the upper section consisting of plains lying in the upper courses of the rivers and (b) the lower portions consisting mostly of the deltas. The lower portions are entirely alluvial while the upper section may be partly called a peneplain covered at places by the alluvium of the rivers. Sand dunes are quite prominent near the seaward fringes of the plains. Some of these dunes enclose lagoons. Lakes Chilka and Pulicat are in fact lagoons of this type. The eastern coast claims some of the finest sea beaches in India.

The western coastal plain stretches along the Arabian Sea from the Narbada valley down to the Malabar coast. This coastal strip is much narrower than the eastern one and claims no deltas worth the name. The plain is widest in the south and gets narrower towards the north. Along the southern half of the plains are situated a number of deep and navigable lagoons. The northern portion of this region forms part of a peneplain. Gujrat and Kathiawar are partly covered by black-cottoo soil.

SOILS

The nature of soils plays a very important part in determining the nature and extent of agriculture in a particular area. Four main

SOILS



types of soils have been recognised in India. These four types are: (1) the alluvial soils, (2) Black-cottoo soil, (3) red soil and (4) the laterite soils. To these may be added the sandy soils of Rajputana. (Fig. 9).

(1) The alluvial soils of India very largely include the Indo-Gangetic alluvium along with that brought down by the Brahmaputra. Besides the northern plains of India, they are also found in the Surma valley in Assam and the south India valleys of the Godavari, Krishna and Cauvery. It is estimated that alluvial soils

Fig. 9.

cover an area of about 300,000 sq. miles in the country. The sands of Rajputana may also be taken as a modified form of the same. These alluvial soils of India are characterised by their ease of cultivation and rapid response to irrigation and manuring. In older alluvium away from the rivers, Kankar (or nodules) have been formed at a depth of a few feet below the surface. Another type of fine soil found alongside the Indo-Gangetic alluvium is *loess* or wind-laid soil found chiefly in the northern Punjab. This loess is very similar to that found in China and U. S. A.

2. The Black-Cotton Soil or *regur* overlies the Deccan Trap and covers an area of about 200,000 square miles—a large portion of Bombay, Deccan, the Malwa plateau, Central Provinces, Berar and parts of Hyderabad, Gujrat and Kathiawar. Some patches also occur in Tinnevely (Madras) and in Bundi and Tonk (Rajputana). The name Black Cotton Soil implies that this type of soil is specially suitable for the growing of cotton.

The black colour of these soils is partly attributed to the presence of accumulated humus. They have a tendency to become very adhesive when wet and moisture is retained for a long time thus making irrigation practically unnecessary. They are highly fertile and are believed to have been under cultivation for more than 2,000 years.

3. The red and slightly yellowish soils are common in the Madras Presidency, Orissa, the Garo and Khasi hills in Assam, eastern Bundelkhand, in U. P. and in southern Rajputana. They have been derived from ancient crystalline and metamorphic rocks and are believed to be of sedimentary formation. The chief type of red soil is a sandy clay.

4. The laterites (or lateritic soils) have a good proportion of white clay and have tints of brown, red and yellow. Agriculturally laterites are poor but proper manuring and tillage may improve them. These soils predominate on the summits of plateaus and hills of South India (Deccan, Central India, Central Provinces, the Eastern Ghats, South Canara, Bombay Presidency, and Malabar) and Assam.

DRAINAGE

The rivers of India play a very important part in the agricultural economy of the country. Long before the modern amenities of transport were available, rivers formed the chief aquatic roads. In the case of war, they were sound securities against foreign invasion.

The courses of the Indian rivers are believed to have undergone great alterations, the most important being the deviation of the river Jumna, which used to flow in a south westerly direction through eastern Punjab and Rajputana. The Indus, the Ganges and the Jumna once formed one system.

The rivers of India may be broadly divided into two main groups :—(1) those rising in the Himalayas or beyond and (2) those

rising amongst the hills of the plateau. The northern rivers are fed by mountain snows and a minimum supply of water is always assured, and this minimum supply can be easily gauged and used for irrigation. The southern rivers that rise amongst the hills of the plateau are dependent on monsoon rainfall so that during the off monsoon months, most of them become almost waterless.

1. The rivers of the north fall into two main systems:—(a) the Indus and its tributaries and (b) the Ganges and its tributaries. The river 'Brahmaputra'* though longer than the Ganges, joins it just near its delta and is virtually an important tributary of the latter.

(a) The Indus (1,800 miles) rises in Kailash at a height of about 17,000 feet. After about 200 miles, it crosses into Kashmir and flows on steadily via Leh receiving the waters of Zaskor, Shyok, and Gilgit. Near Chilas the Indus finally turns to the south. Shortly it leaves Kashmir and enters British India and forms the boundary between the districts of Peshawar and Hazara in North-West Frontier Province. Further down is Ohind where Alexander crossed the river. Just below the junction of the Kabul river is a more important passage at Attock. When it passes the western extremity of the Salt Range, the river spreads out into a wide lake-like expanse of water. In the Muzaffargarh district of the Punjab, it receives the Panjnad which brings to it the whole tribute of the five rivers of the Punjab viz., the Jhelum, Chenab, Ravi, Beas and the Sutlej (900 miles). From the west the Indus receives the Kurram. Below Kalahagh the river is a typical plain stream of great size so much so that opposite Dera Ismail Khan the valley is seventeen miles across. At Sukkur in Sindh a dam by the name of Lloyd Barrage, has been constructed for the purposes of irrigation. Near Hyderabad the delta stage is reached and the river is split up into a number of channels which all flow down into the Arabian Sea.

(b) The Ganges* (1,550 miles) has its source at Gaimukh in Tehri State (about 30°N and 79°E.) It pierces through the mountains under the name Bhagirathi. Subsequently the Alakanda joins the Bhagirathi and the joint river is then called the Ganges. At Hardwar it enters the plains and then flows south and south-east. It is tapped at Hardwar by the Upper Ganges Canal and at Narora by the lower Ganges Canal. At Allahabad its most important tributary the Jumna joins it. In the district of Farrukhabad, the Ram Ganga joins the Ganges on the right bank. A little below Bhagalpur in Bengal, the delta stage is reached and the Ganges breaks up into a number of branches most important of which are the Hoogly and the Padma.

Amongst the tributaries the Gumti, Gagra and Gandak in the north and the Son in the south are also worth mentioning.

The continued importance of the river as a source of fertility and water to the fields and as a means of transport, has given it

* Known as the Tsangpo through its long Tibetan course.

the name and the rank of a goddess. Dying persons are taken to its banks to expire and corpses are cremated on its banks with the firm belief that the departed soul will attain eternal bliss. A dip in the Ganges is a very sacred undertaking.

The Brahmaputra (1,680 miles) is technically a tributary of the Ganges. It rises beyond the Himalayas near Mansrower lake and flows through Tibet under the name of Tsangpo. Near the eastern edge of the Himalayas the Brahmaputra enters India and flows South until it joins the Padma—a branch of the Ganges.

2. The rivers of the south, as has been remarked before, form quite a different category. Of these rivers, the most important are (a) the Nerbda and the Tapti that are in the extreme north and flow east to west and empty into the Arabian Sea. Because of the swift speed and narrow coastal plains, the rivers only form estuaries — and (b) the Mahanuddy (520 miles), the Godavery (900 miles) the Krishna (800 miles) and the Cauvery (472 miles), that rise in the western hills and flow eastward into the Bay of Bengal. They make quite big deltas. The two small rivers of the south, the Vaigai and the Penner also flow eastward into the Bay of Bengal.

APPENDIX

Earthquakes. Earthquakes are more frequent in the regions of 'marked instability' i. e., in areas where earth movements like folding

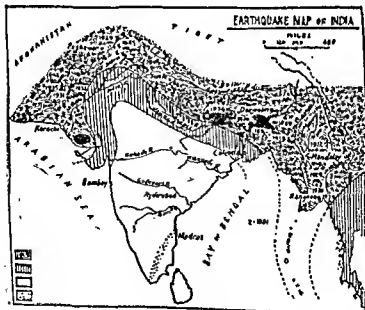


Fig. 10. (After west.)

and faulting are continuing. The Himalayan region is perhaps the most unstable region in the country and that is why nearly all earthquakes of major intensity occur round about there. The serious earthquake in Bihar (1934) is attributed to faulting in and around that region. The more recent earthquake of Quetta (1935) is attributed to the folding movement going on in the bending hills around. The intensity both in frequency and seriousness of earthquakes decreases as we move southwards.

The Indo-Gangetic alluvial tract is an area of 'comparative intensity' and tremors are quite occasional. The peninsular block is a zone of feeble seismicity. It, however, has slight sympathetic tremors when severe earthquakes occur in northern India.

Volcanoes. Volcanic activity is of minor importance in the country now although geologists tell us that "Tertiary volcanism" has been fairly widespread in the Himalayas, Burma and Baluchistan*. Some minor activity is found in Barren Islands and in Baluchistan†. Some Mud volcanoes occur in the Arakan Yomas and in the Mekran coast of Baluchistan. Owing to the dryness, the cones here attain much greater heights than in the east.

CHAPTER III. CLIMATE OF INDIA

As a whole India has a climatic unity and is essentially tropical in her climatic essentials inspite of the fact that the Tropic of

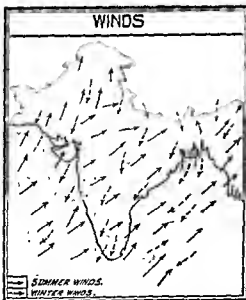


Fig. 11.

Cancer divides her into two parts. Yet within her natural boundaries the country presents a greater variety of climatic conditions than found in any other area of similar size and importance. The contrasts are really surprising. Taking temperature for instance, there are places in the northern area where as low as -50°F have been recorded; on the other hand Jacobabad in Sindh occasionally reaches 125°F and above. Rainfall varies from 460" at Cherrapunji in Assam to 3" or less in upper Sindh. Contrasts in the daily ranges of temperature, humidity and pressure are equally striking.

*Krisnan—*Geology of India and Burma* p. 35.

†Narcondam in the Burmese arc is also reported to have some,

India furnishes a striking large-scale example of the changing of seasons known as 'Monsoons'—a phenomenon which is due to a number of causes, the outstanding of which is "the difference of temperature in the winter and summer months respectively between southern Asia on the one hand and the Indian ocean and China seas on the other". This difference in temperature brings about a marked change of pressure conditions in this region. The summer monsoon is the south-west winds come from the sea and carry rainfall to all the parts of India while the winter or the north-east and north winds are of continental origin and are thus associated with great dryness except when they pass over a stretch of ocean.

The seasons have been grouped thus —

1. Season of the North-East and North Monsoons :—

(a) Cold weather season—December to February

(b) Warm Weather season—March to June

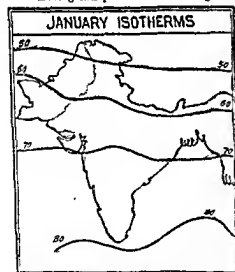
2. Season of the South-West Monsoon :—

(a) General rains—June to September.

(b) Season of retreating Monsoons—October to December.

COLD WEATHER SEASON.

During this period there is a general decrease of temperature



all over, but naturally the temperatures in the north are much lower as is clear from the following table showing winter temperatures of some places.

Peshawar	... 50°F
N. Punjab	... 55°F
Benares	... 60°F
Madras	... 75°F
Calicut	... 78°F
Colombo	... 70°F

The winter isotherms are free from any irregularities and have regular east to west tracks. The decrease in temperatures is, however more sudden and more marked in highlands where the winter snowline is soon reached. The January temperatures in India compare favourably with July temperatures in Europe.

A high pressure area of great intensity covers the land mass of



Fig. 13. Rainfall

central and south-eastern Asia and has its centre somewhere near Lake Baikal. A secondary system of similar intensity covers north-western India and Kashmir—having a slight but a fair continuous southward gradient thus giving north-west, north and north-east winds moving towards a low-pressure region situated south. These winds are not very intense and their speed varies from about 3 to 5 miles an hour. These winds being of continental origin, there is practically no winter rainfall in the country; only the small portion of the Madras coast gets rainfall during these months. North-west India* fortunately receives during the winter months enough rainfall

to maintain such winter crops as wheat and Barley. This rainfall is, however, cyclonic in character and these cyclones (western disturbances) are thought to come from the Mediterranean Sea via the Iran plateau. They are, however, of low intensity and fail to reach the Ganges.

HOT WEATHER SEASON

In March the temperatures begin to rise all over specially in the interiors and the atmospheric pressure diminishes. The wind is still north over the plains but sea-breezes get more prominent on the sea coasts. They bring some rainfall to the Malabar coast and the

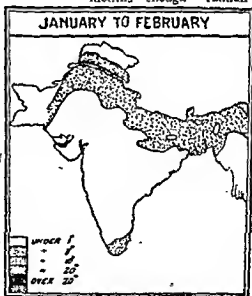


Fig. 14. Rainfall

*More specially in the Punjab.

Ganges delta but owing to their feebleness the rest of India remains unaffected. The heated air ascends but there is no rainfall, as the relative humidity is low. A great low pressure area is created over the Thar desert and the adjoining lands. In May, which is perhaps the hottest month, the isotherms assume shapes of concentric circles. The greater part of India has an average temperature of 85°F to 95°F . At many places even 105°F is reached. The daily range specially in the North-West is quite large. General humidity is very low—1 p. c. to 3 p. c.

The hot-weather season is usually associated with dust storms that come from the west. The storms are strongest in the north-



Fig. 15. Rainfall

west and there visibility is usually quite poor. Hailstorms are often caused by the cool north and north-west breezes, more specially in Bengal and Assam.

GENERAL RAINS

By the end of May the Hot-weather conditions are intensified and there is a definite low pressure area over North-West India. The air circulation gets more and more vigorous. The south-east Trades (that become south-west after crossing the equator) are abruptly pulled up and they become a part of the Indian wind circula-

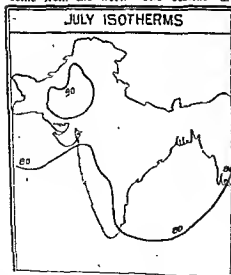


Fig. 16.

tion. These South-West Monsoons carry large amounts of water vapour and give about 90 per cent of the total rainfall to India. The setting in of the monsoon is usually referred to as 'bursting' and it is characterised by heavy downpour of rain accompanied by violent thunder and lightening. Temperatures fall sharply.

The following figures show the average decrease in temperature at this time :—

Peshawar	4°F	Patna	7°F
Lahore	7°F	Calcutta	4°F
Delhi	8°F	Bombay	4°F
Ajmer	8°F	Bangalore	7°F

The south-west monsoon blows over the entire land mass as a fairly steady wind and its speed is about 6 to 8 miles per hour. At the eastern coast its speed is as high as 14 to 20 miles per hour but it slackens considerably as it goes into the interior. The actual direction and the velocity of the winds depend on the topography. The Deccan divides the monsoon into two branches *i. e.*, the Arabian Sea branch and the Bay of Bengal branch, the latter reaches the land later but it gives rainfall to a much larger area. The former is much

more powerful but the Western Ghats that meet it as soon as it reaches land, deprive it of much of its vapour and energy. Certain currents of this branch reach the interior through the Narbada gap and join the Bay of Bengal branch in Chhotta Nagpur.

The map in the Frontispiece shows the direction of these winds and their arrival at different places in the country. By about the end of June the entire country is under monsoonic influence. The following table gives the normal dates of monsoon commencement in the various parts of the country.

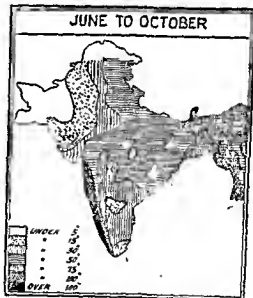


Fig. 17. Rainfall

Malabar	3rd June	Deccan	7th June
Bombay	5th June	Bihar	17th June
East U. P.	20th June	West U. P.	25th June
C. P.	10th June	Western Punjab	25th June
C. I.	15th June	Eastern Punjab	30th June

Rajputana	15th June	N. W. F. P.	25th June
Bengal	15th June		

The eastern hills and the Himalayas deflect the S. W. winds to the west. July and August are the months of general heavy rains in the country and by about the 2nd week of September, rainfall begins to diminish. The local distribution of rainfall, however, depends largely on the topography of land and on the direction of ranges in relation to the wind direction. As shown in the relevant map (Fig. 17) the general rainfall distribution may be like this.

The northern plains show a westward decrease,* the highest rainfall being in the eastern hills. The averages are:—

Assam and E. Bengal—Over 80".

Western Bengal, Bihar and Eastern U. P.—40" to 80".

Western U. P. and Eastern Punjab—30" to 40".

Western Punjab, N. W. F. P., Sind and Rajputana—below 20".

The places near the mountains e.g., the Tarai get higher rainfall.

In the Indus Valley there is a south to north increase—the highest being in northern and north-eastern Punjab.

In peninsular India, the highest rainfall is recorded in the western coastal plains and on the western slopes of the Western Ghats but beyond the Ghats, there is an abrupt decrease, the area being in the rain shadow.

More than 80 per cent of the total Indian rainfall takes place in this period. There is really little difference in the map showing the annual rainfall of India and the one showing the precipitation during the season of general rains.

The relative humidity during this period is naturally high. Temperatures are decreasing gradually after that sudden 'jump down' and pressures go on rising steadily. By about the beginning of September the monsoon currents gradually lose their power but this weakening is a gradual process. The map in the frontispiece gives the withdrawing of the monsoon. The 'retreat of monsoon' is characterised by cyclones, and storms usually of a local character.

SEASON OF RETREATING MONSOON

This is a period of transition. In October the monsoon ceases to blow and the whole of India experiences a sultry, uncomfortable weather. Such conditions, in some degree, last till about the middle of December. The Bay of Bengal branch retreats down the Ganges

*The following table illustrates very clearly the east to west decrease in rainfall in Northern India:—

Cheerspunji	430"	Delhi	27.6"
Calcutta	65.6"	Lahore	21.9"
Patna	42.8"	Peshawar	13.5"
Allahabad	37.6"	Jacobabad	3"
Agra	26.2"		

Plain. The Arabian Sea branch retreats down the Indus Plain in a similar manner. The low pressure system shifts to the south in the centre of the Bay and thence further south. A similar low pressure area is situated in the Arabian Sea. This period is associated with very low rainfall in the country. But the southern coast of Madras and some other eastern areas adjoining to it get sufficient quantities. In the coastal regions already mentioned, October and November are the rainiest months. Cyclones that develop in the Bay of Bengal also give rainfall to these regions. (Fig. 13)

With the retreat of the south-west monsoon, the sky clears and the days become bright and sunny again. Temperatures fall rapidly; the minimum is reached sometime in December. North, north-east and north-west are the prevailing winds in the country. Cyclones of Mediterranean origin sometimes disturb the continuity of these conditions in the north-west and give some rainfall*.

ECONOMICS OF THE INDIAN RAINFALL

If we take the whole of India, there is only a small portion of

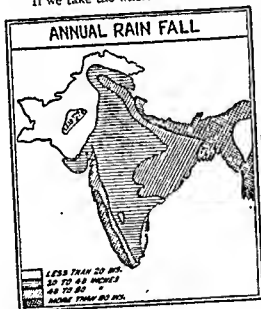


Fig. 18

the country that gets below 20" of rainfall during the year. The Indian average is 42" per year. But as actual facts stand such general statements and averages are of little use. The unavoidable facts remain that the rainfall is very unevenly distributed throughout the country and that it is limited to a period of three months in a year. Other points to be taken into consideration are that it is liable, (a) to fail partly or totally, (b) to arrive late or (c) to cease much earlier than usual—all cases are equally harmful. The chief characteristics are fully described below.

1. About 90 per cent of the total rainfall comes between mid-June to mid-Sept. Double-cropping is, therefore, possible with the help of irrigation only.
2. The monsoon may arrive late in the whole country or in any

*It is interesting to note that some part of India is always receiving rainfa

Agriculture is only possible in some favourable spots with the help of irrigation.

2. **The Transitional Zone.** Surrounding the above in the north-east and south-east is a region having essentially transitional character. It stretches across the Punjab reaching to about 70 miles of the outer Himalayas. Further east where it swings southwards it approaches about 30 miles of Delhi and the Jumna. Between the desert and the Aravallis it is limited to a narrow zone which, however, widens out towards coastal areas. The annual precipitation may be between 15" and 20". The variability is also high.

3. This zone includes the sub-Himalayan Punjab and the upper and central sections of the Gangetic Plains. The annual rainfall varies from 20" to 50" increasing towards the north and the east. It is, however, important to bear in mind that the fluctuations of the Rabi rainfall are twice as great as those of the Kharif precipitation—15 to 20 p. c. in summer and 40 p. c. in winter.

4. This comprises the eastern sub-Himalayan tract in the north of Bihar, together with the western part of the Gangetic delta and the lowland fringing the uplands of Bihar and Orissa including those of the lower Mahanadi Basin. The rainfall is between 50 to 75 inches with the minimum in the areas adjoining No. 3 and also east of the Rajmahal foot-hills. There is marked precipitation in spring months usually increasing through the year to a single maximum in summer. Variability is very low—10 to 15 p. c.

5 Eastern Bengal and the Assam valley form a region of heavy rainfall—the rainy period is also much longer. Variability is between 5 and 10 p. c.

6. The west coast region of Peninsular India proper, like No. 5, is a region of very heavy rainfall—75" to 100". The variability is equally low.

7. Gujrat with Kathiawar, north of the west coast region forms the better endowed of the transitional zones between it and the desert region. Here the annual rainfall ranges from 20" to 50" and the July maximum appears to predominate more than anywhere else in India with over 40 per cent. of the annual precipitation. The period of rain is most restricted north of the gulf of Cambay where the monsoon rains cease in September.

8. The greater part of the Deccan has an annual rainfall ranging from 50 inches down to even less than 20 inches. The rainfall is on the whole very uncertain. The amount dwindles rapidly eastwards from the ghats and is lowest in the great central block which is also more fickle, although the area with the actual minimum lies towards the east, the rainy period extends over a larger period of the year and the centre of high variability does not coincide with the seat of the least rainfall.

9. This region covers that part of India which derives most from the retreating monsoon as it 'curves back' over the

Bay of Bengal. It includes nearly the whole of the Madras Presidency southwards from Vizagapatam with the exception of the Deccan districts. The annual precipitation ranges from 20" to 50" and above, the average being heavier on the coastal regions. Variability again decreases from south to north.

10. North-east of the Deccan is characterised by lowlands with hill frames. East of Indore in Central India its boundaries are carried beyond the Vindhyan escarpment. Varied relief brings considerable local divergencies of rainfall which ranges generally from about 45" in the west to about 60" in the east. The variability is everywhere less than 20 p. c. Hence acute economic distress is rare. Both the branches of the monsoon feed this region. In winters a few cyclonic showers may also occur.

11. This region comprises of Ganjan with the eastern Ghats South of Puri. Rainfall is considerably lower than that of the Mahanadi Delta, and is less on the coast than in the upland interior. In this respect it is allied to the coastal districts in the south and may be regarded as transitional. Variability is tempered as against the south, but Ganjan is liable to serious deficiencies at intervals.

12. The twelfth region covers eastern Rajputana and central India. The former has a rainfall between 20" to 25" and marks the limit of Peninsular India proper. The record of Ajmer shows that the fluctuations are very marked and it has more years of serious deficiencies than any other station in the peninsula. In central India rainfall recovers beyond Eastern Rajputana but diminishes towards the Gangetic trough.

13. The thirteenth region covers Khandesh with Berar and north-east Hyderabad. The western part lies apart with its low rainfall (5" to 20") and higher variability. In eastern Khandesh and Berar and north-east Hyderabad, the rainfall is between 30" and 40" increasing towards the Khandesh side. Though rainfall is more reliable than in the Deccan, the area does not come within the zone of 20 p. c. variability and this is the chief region for its inclusion from region No. 10.

THE MAJOR CLIMATIC REGIONS OF INDIA

While concluding this topic, it is usual to incorporate all the above information about the climate of India into what we call the major climatic regions. Dudley Stamp in the latest edition of his 'Asia' has broadly divided the country into two parts* i. e., (1) Tropical India and (2) Continental India, separated roughly by the Tropic of Cancer. There is nothing wrong with this division but upto now we have failed to understand the special desirability of such a division because it is only too obvious. The country has been further divided into eleven regions. Kendrew follows the same scheme (see appendix). The rainfall regions described above should in our opinion form a good basis for a climatic study of the country as rainfall is of paramount importance in the climatology of India. A division of the country into natural regions may be of further help.†

*On the suggestion of Kazi Saeed-ud-Din Ahmad

†This has been done later in this book.

CHAPTER IV

NATURAL VEGETATION.

As is consequent, India has a great variety of natural vegetation owing to a similar variety in rainfall. The truth, however, is that it is only very seldom that one comes across true vegetation in the various localities as most of the land has long been cleared for cultivation. Broadly speaking, however, India may be divided into six vegetation zones :—

- (1) Evergreen Forests of the wet zone.
- (2) Deciduous forests of the Intermediate zone.
- (3) Scrub and grasslands of the dry zone.
- (4) Deserts and semi-deserts of the arid zone.
- (5) Mountain vegetation.
- (6) Tidal forests of the river deltas.

The evergreen forests cover (1) the western coastal plains and the western slopes of the western ghats, (2) lower slopes of the eastern Himalayas, (3) Assam, (4) Eastern Bengal and the Andamans. The trees are mostly of the equatorial type and the tree growth is vigorous. Although the number of botanical species is large, only one species is found in a big stretch of land, a fact that presents serious disadvantages in the exploitation of timber. Canes and bamboos which often comprise the undergrowth are of great commercial use.

The deciduous or the monsoon trees are the most characteristic of Indian forests and formerly covered about 50 per cent. of the country. It is very seldom that one comes across this type as most of the land has been cleared for cultivation.

Some stretches of these forests are, however, found on the western side of the plateau and in the Himalayan track in the north. Teak, Sal, and Sandalwood are the most important trees.

The drier parts of the Deccan and north-west India are covered by dry and scrub. The

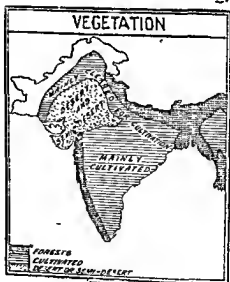


Fig. 22

trees are small in growth but their leaves are thorny. Babul is the most important variety.

A tropical desert region covers a larger portion of Rajputana, southern Punjab and portions of Sindh. Here the rainfall is below 10 inches.

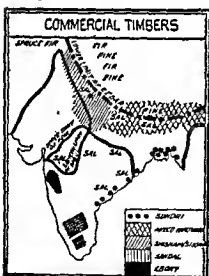
The higher slopes of the mountains—higher than 3000 feet, the Frost line—in the north are covered by the typical mountain vegetation. But in the southern latitudes it occurs at 5000 feet. The nature of this vegetation is hardy trees. Oak, deodars and conifers are the chief species.

Tidal forests usually consist of mangrove trees and abound in the deltaic regions of Bengal and the eastern coastal plains. Sundry is the most important tree of this region.

Fresh-water forests are found a bit higher up from the sea, while the salt-water species abound just on the coasts and portions of their roots go on to the salt waters of the nearby sea.

FORESTS

In 1940-41 about 68 million acres of land were covered by forests or about one sixth of the total area was forested. The following table shows some of the more important provincial figures.



In thousands of acres	
C. P. and Berar	15,857.0
Madras	13,178.2
U. P.	9,274.6
Bombay	8,336.1
Bihar	8,606.9
Bengal	4,482.9
Assam	4,153.4
Orissa	2,637.8
Punjab	1,975.2

The total figures show a tremendous decrease in the forests of the country. In 1918 we had about 3.5 lakh square miles. In 1925-26 the figures showed a decrease of about 2 lakhs. Another drawback is that a vast percentage is so situated that it is quite impossible to use them, (specially the great resources of the Himalayas) because of difficult means of transport.

Fig. 23 (After Lorenzo)

The forest products may be divided into (1) Major products such as timber, fuel-woods and (2) Minor products such oils, gums, lacs, etc.*

*Plantation products such as palms, rubber and tea may be quoted as third type.

Timber and fuel-wood are the most important forest produce and our annual production of timber is sufficient not only to supply our own internal needs but much is sent to foreign markets in Europe. The total production of timber and fuel-wood is about 375,000,000 cubic feet out of which the chief suppliers are Bombay, Central Provinces and Berar, U. P., Punjab and Bengal. We have very little pulping wood. Insects like the white ant, and rot shorten the life of our timber.

Lac is perhaps the most important minor produce. It is a kind of sticky matter secreted on the branches of certain trees by an insect. Out of a total of world production of 1,699,000 maunds of lac per year. India claims about 1,200,000 maunds; the chief producers are Bihar, Chotta Nagpur, Bengal, Central Provinces and United Provinces. Bihar gives about 60 per cent. of the world total.

Our local requirements cover only about two per cent of the total production and the rest is exported to U. S. A., Japan, Germany, France and United Kingdom. More than 90 per cent of the lac exports pass through Calcutta.

Amongst the oils, Sandalwood oil is the most important. It comes chiefly from the sandalwood forests of Mysore. Some is also had from Madras, Coorg, C. P., and Bombay.

For administrative purposes forests are classified as under :—

(1) Reserved Forests—107,000 sq. miles.

(2) Protected Forests—6200 " "

(3) Unclassed Forests—135,700. "

Reserved forests belong to the Government. "Protected forests are those over which Government have proprietary rights but which are not included in reserved forests." Government have a right to declare any class of forests as reserved; or close any part of a forest for a period upto 20 years. All other forests are classed as "un-classed."

Steps are being quickly taken towards a systematic working of forests. The Forest Research Institute at Dehra Dun is doing much research work in this direction. Three problems seem to be attracting much attention.—(1) To find out suitable wood for aircraft building; (2) To find out suitable pulping-wood for making paper and; (3) to find out suitable wood for electrical purposes. Now we can get along without importing plywood, battery separators, shuttles used in textile mills and many other similar items.* Besides, there are hopes of producing large quantities of turpentine oil, rubber and medicinal herbs. Forests are expected to play an important role in the manufacture of cellulose whose importance is bound to increase in the coming years.

*Modern Review, December, 1942 p. 415.

AFFORESTATION AND DEFORESTATION

It is hardly necessary to give all the direct and indirect uses of forests here. We have already described some of the more important forest products like timber and oil. It is perhaps generally realised that tree fodder, forest grasses and shrub growth contribute to the feeding of livestock. It may, however, be interesting to learn some of the indirect uses. Forests afford a good cover for the soil and thus mitigate the danger of soil erosion, a problem which has suddenly become acute in India owing to the unwise policy of clearing the forests or deforestation followed during the centuries gone by. A lot of soil is formed by the disintegration of the rocks and this fully replaces the quantity taken away by rain-water. The undergrowth and leaves rot to form humus which is rich in plant food. The forests lower the temperature and help in condensing the clouds and thus bring rainfall. They enable the soil to retain the moisture. Floods are often prevented by the presence of forests.* It is because of these points that it is said to be desirable to have at least 25 per cent of the total area of a country under forests.† It is unfortunate, therefore, that in most of the Indian provinces the area under forests is disappointingly low as is shown in the following table.

Punjab	5.1 p. c.	Bombay	17.1 p. c.
N. W. F. P.	2.1 p. c.	Orissa	14.7 p. c.
Bihar	6.2 p. c.	Bengal	14.0 p. c.
Sindh	2.5 p. c.	Ajmer=Merwara	5.1 p. c.
Madras	12.2 p. c.		

So great was the destruction of forests in India that in 1855 the Government drew up rules and regulations to preserve forests in the hills. A special Forest Act was passed in 1918; and forests in more important places like river catchments were preserved. More effective and constructive measures are yet needed to bring back the things to normal. A policy of afforestation has now begun. In most of the provinces we have now special branches in the Forest Departments whose business it is to do useful work towards afforestation and consequent soil preservation. "The afforestation of the upper catchment areas of the rivers and the proper and sustained management of both the reserved and the village forests" is advocated as a cure for soil erosion by Sir Harold Glover in his Pamphlet, "Soil Erosion" (p. 32).

*The frequent floods in Orissa are often attributed to the deforestation of hill slopes of Chhota Nagpur.

†Gortie, land management p. 11.

‡Glover, Soil Erosion p. 8.

CHAPTER V

AGRICULTURE IN INDIA*

India is essentially an agricultural country. More than 75 per cent of her population are in some way or the other connected with agriculture. About fifty per cent of the total area is under cultivation. The following two tables give an insight into the actual state of affairs.



Fig. 24.

Table I

Land Utilization Figures (in millions of acres).

	British India	Indian States
Total area	= 511	147
Forests	= 68	19
Not available for agriculture	= 89	28
Cultivable waste	= 97	19
Current fallows	= 47	13
Net area sown	= 210	68
Percentage of the sown to total area	= 41	47

*Matter from Mr. V. S. Mathur's thesis on Agricultural Development of Western United Provinces" has been freely used in this chapter.

Table II

Occupational Percentages

Agriculture	... 67.1 p. c.
Minerals	... .02 p. c.
Industry	... 10.1 p. c.
Trade	... 5.1 p. c.
Public Force	... 0.6 p. c.
Public Administration	... 0.7 p. c.
Transport	... 1.5 p. c.
Professional and Liberal Arts	... 1.5 p. c.
Miscellaneous	... 13.3 p. c.

In India "farming is not a business, it is a tradition." Since long Indian agriculture has been a "gamble in rainfall" specially in regions getting low precipitation. Irrigation therefore plays a very important part in Indian agriculture. In 1939-40 more than 22 per cent of the gross cultivated area was irrigated. Irrigation facilities are not so very satisfactory in the Indian states where out of a total of 68 million acres of cultivated land only about 10 million acres (or about 16 per cent) are under irrigation. The following table shows (Indian Year Book 1943-44) the irrigated percentages for the various Indian provinces:—

Madras	20.49 p. c.
Bombay	1.71 p. c.
Bengal	0.81 p. c.
United Provinces	14.53 p. c.
Punjab	38.80 p. c.
Bihar	3.40 p. c.
C.P. (excluding Berar)	1.50 p. c.
N. W. F. P.	18.28 p. c.
Orissa	4.68 p. c.
Sindh	89.12 p. c.
Rajputana	6.82 p. c.
Baluchistan	4.76 p. c.

Another important advantage of irrigation is that double-cropping is made possible. In U. P. and the Punjab which are perhaps the most irrigated provinces of India, about 78 and 44 lakh acres are cropped more than once. Similar figures for Bombay, Bihar (and Orissa), and Madras are 14, 52 and 61 lakhs of acres respectively.

Irrigation also affects the yields of crops. Experiments and experience reveal that average yields of irrigated areas are appreciably higher. According to the estimates of Chinsura Agricultural Farm the average yield of paddy grown without irrigation is as low as 15 maunds per acre as compared to 28 maunds of paddy grown with irrigation. According to the information collected by Mr. V.S. Mathur (one of the authors of the present book) the average

Specialised markets are very few, and, those that exist serve as central stations for the collection and distribution of the various crops of the neighbouring areas.

At the top is the Indian Chamber of Commerce, then come the wholesale markets generally called 'Mandis.' The bigger 'Mandis' have their own organisations, while the rest including rural markets are not controlled. The buyers and sellers are left to deal between themselves.

The following table shows the names of the bigger commodity markets in northern India :—

Wheat: Meerut, Muzaffarnagar, Cbandausi, Hapur, Hathras, Ghaziabad, Lyallpur, Karachi.

Cotton: Agra, Aligarh, Hathras, Cawnpore, Ludhiana and Amritsar.

Sugar-cane: Bareilly, Shahjhanpur, Cawnpore, Muzaffarnagar.

Hapur is the biggest 'Mandi' in U.P., and together with Amritsar in the Punjab has snatched from Bombay the place of honour in the matter of supremacy in the wheat trade. It has its own Chamber of Commerce, its daily trade news bulletin and its forward transaction. The 'Mandi' also makes efforts towards preventing adulteration of produce, simplifying marketing charges and organising trade on a better footing.

In some villages are found a few local markets where the producers take their produce for disposal. The position of village markets tallies fully with that of the cultivated area. Distribution of grain markets is essentially controlled by the distribution of agriculture and ultimately by geographical environment.

The village markets involve bazar-like dealings rather than organised trade. Mostly the markets are held once or twice a week in some open space, and that day is a day of holiday in the village when all go shopping. They are without a system and involve arduous travels over rough and unmetalled roads which, however, the farmer prefers to going to bigger markets by rail or motor. And the villager prefers selling his produce in these village markets because bringing produce to the big 'Mandis' involves a good amount of money for transport and carriage charges, and then the wholesale dealers quote their own terms which are seldom reasonable, with the result that either the villager has to take back his goods or sell them at a loss.

There is no marked tendency towards co-operative marketing of agricultural produce. Solitary institutions work here and there, but they are hardly able to cope with the demand. More co-operative societies could function on these lines to the great advantage of the cultivator. They could give advance money to the producers until they get a fair value for their produce. Besides, they could educate the cultivator in improved methods of production and pre-

paration of his produce, facilitate the grading of produce and put the backward village farmer in touch with the bigger markets.

The holding of surplus supplies from periods of plenty for periods of scarcity is one of the most essential items in profitable marketing. The economic advantage of storage is that it aids in adjusting variable supplies to the relatively constant needs of the buyer.

Unless storage is safe and free from damage by insects, rodents etc., it cannot prove profitable. Cultivators store grain in their houses in earthen pots or in a corner of a small living room. Both the practices are practicable only for small quantities. For bigger amounts 'Khattis' or cells in the ground, or barns are preferred but in both places there is danger of damage. The bigger merchants generally use the latter places. Even in normal years there is a considerable amount of deterioration in the quality of the grain, besides the damage on account of rats, sub-soil damp and the consequent chemical reactions. At Muzaffarnagar Mr. V. S. Mathur was shown round by an official of the Grain Chamber some of the newly built 'Khattis' or storage pits made of reinforced concrete. The official said that these scientific pits are water-proof, insect-proof and hygienic. There is a tendency in that market to abandon the old 'Khattis.' These new storage chambers of reinforced concrete in Muzaffarnagar are the first of their kind in Northern India and it is hoped that other big markets like Hapur will soon follow suit.

Both marketing and storage development should be a concern of the agriculturalist and the wholesale dealer; and organised marketing, direct dealing, thereby eliminating the village 'bania' or the middleman, should be encouraged as it brings village prices into greater accord with local 'Mandi' prices, to the benefit of both the producer and the buyer. That private enterprise is not forthcoming, is to be regretted. Any scheme planned and financed by the Government can hardly succeed without the co-operation of the people.

This line of improvement is directly connected with the agricultural development of the country. It will not be very wrong to say that the development in marketing (to enable the producer of the crop to have some profit out of his produce) has a direct bearing on the subject of agricultural development and should go parallel with that of the latter. Unless he gets profits and is sure that if he grows more, he will earn more money, the cultivator will be very reluctant in trying to increase his acreage under crops, or make better use of the irrigational facilities or the other improvements introduced hitherto.

2. INTERNAL TRADE

The full significance of our home or internal trade is not yet fully realised as not much has been done to develop it. While the

IMPORTANT TRADE CENTRES.*

There are a considerable number of towns in the interior which deserve mention either as distribution or industrial centres.

1. Calcutta is important from the latter point of view as the centre of the jute manufacturing industry all the jute mills in Bengal being situated within its boundaries or within a few miles on the banks of the Hooghly. There are many flour and paper mills, match factories, chemical works and rice mills, a large number of oil mills, iron foundries, tanneries, etc. The great Tata Iron and Steel Works at Jamshedpur are only about 150 miles from here. Calcutta is also an important centre for the export of tea and is the home of many miscellaneous industries such as soap, perfumery and toilet goods, enamelled and porcelain ware, glassware, celluloid and horn articles, cardboard boxes and tin cans, hats, waterproof cloth, etc. Coal also forms an important commodity of trade. Calcutta exports the bulk of raw hides and skins.

2. The outstanding industrial features of Bombay and its environs are its cotton spinning and weaving mills, dyeing and bleaching works and metal stamping factories and the Hydro-electric works at Lonavla and in the Andhra valley. It is at the same time the chief distributing centre in Western India for very large imports of cotton manufactures. A preponderating share of the trade of Bombay is in Indian hands and the majority of the mills are under Indian management. Bombay is one of the most important markets of oilseeds and has a valuable crushing and oil refining industry. There is considerable trade in oil cakes with the United Kingdom.

3. Madras is of no great importance industrially though it possesses the two most up-to-day cotton textile mills in India. Madras is an exporting centre for groundnuts, fire-cured and other types of tobacco and tanned hides and skins.

4. In Karachi the wheat trade is largely financed by European firms, though Parsees, if to a much smaller extent than at Bombay, have important commercial interests. Karachi is an important distributing centre for the Punjab and Sind wheat.

5. Cawnpore on the Ganges in the United Provinces, is industrially and commercially of great and growing importance. It is an important railway junction and its situation about 870 miles from Bombay and 630 from Calcutta has made it a convenient distributing centre for the imports of Manchester piecegoods, hardware and machinery from both these ports, while its factories produce very large quantities of leather goods, woollen, cotton textiles and tents. The city also boasts of flour mills, oil mills, and chemical works and there are a number of flourishing minor industries.

6. Delhi is now the capital of the Indian Empire. It is the junction for nine railway lines and an important clearing house for

*The Handbook of Commercial Information for India (1937)—pp. 109—113 and the *Namanda Year Book* (1944-45) pp. 268—279 have been freely used.

Punjab and the western districts of the United Provinces particularly for cotton, silk and woollen piecegoods. There are cotton spinning and weaving mills, biscuit factories, and many flour mills. It is noted also for its art industries, such as ivory carving, jewellery, lace work, silversmiths' work, pottery and gold and silver embroidery. Delhi is famous for embroidered shoes and slippers and for its lamb-skin and fur trade. It is also known as a buying centre for milch cattle and buffaloes.

7. Ahmedabad is, next to Bombay, the most important industrial centre in Bombay Presidency. It contains 99 cotton mills.

8. Amritsar 30 miles east of Lahore, is also of considerable importance commercially. Apart from its entrepot trade in piecegoods, a large business in skins and hides is done here and its carpet industry is well-known. Amritsar is an important storehouse for grain and possesses two active "Option" or "Futures" markets for wheat.

9. Agra is chiefly famous for the architectural monuments of the Moghuls though its manufactures of carpets and daris, embroideries, and stone work are considerable. It is also a collecting centre for better qualities of hides.

10. Asansol (in Bengal) is an important railway junction and one of the chief centres of the coal industry in India.

11. Bangalore is in the Mysore State. It is 219 miles by rail from Madras. Its chief manufactures are carpets, cotton textiles and woollen goods and leather. Bangalore has many miscellaneous industries both private and state-aided such as soap, porcelain, shellac, furniture, gasmantles, white lead and cigarettes.

12. Lahore is the capital of the Punjab and though of small importance industrially, apart from the large workshops of the North Western Railway, it is the chief trading centre for the agricultural produce of the province. It tends relatively to lose its place as a trading centre for agricultural produce owing to the development of canal colonies in other districts of the Punjab.

13. Slalkot is the centre of the sports goods industry in the Punjab.

14. Benares, situated on the Ganges about 400 miles north-west of Calcutta, is the holy city of the Hindus. Commercially it is chiefly of interest on account of its great silk weaving industry.

15. Lucknow, is the cold weather capital of the United Provinces. Its industries are small but commercially it is of interest as a distributing and collecting centre for the rich agricultural products of Oudh.

16. Nagpur, on main the line between Calcutta and Bombay at the
an Peninsula and Bengal Nagpur Railways,
importance

is due to its prosperous weaving mills, cotton ginning and pressing factories and the extensive manganese deposits in the neighbourhood. Nagpur is famous for its loose skinned *sungara* oranges.

17 Jubbulpore, an important railway junction linking the East Indian with the Great Indian Peninsula Railway, contains a central gun carriage factory, a spinning and weaving mill, a number of pottery works, and railway workshops.

18 Mirzapur in the United Provinces, boasts of a brass industry for the manufacture of domestic utensils, but it is mainly important on account of its shellac and carpet industries.

19 Madras is the centre of considerable silk and cotton weaving and dyeing industries and is the second town of importance in the Madras Presidency.

20 Vizagapatam has now been declared a major port. Manganese ore, myrabolam and groundnuts are the chief exports from this port. Tobacco is also exported.

21. Dacca, is the most important city in Eastern Bengal, in the heart of the jute-growing districts. Its muslins were formerly famous in Europe and there are still a number of handlooms working here. It is a large collecting centre for hides and skins.

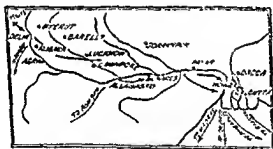


Fig. 51. Some cities of the Ganges Basin.

22. Srinagar, the capital of Kashmir, is situated on the Jhelum river. It is famous for its embroideries and carved wood work, and the largest silk filature in India.

Sholapur and Amravati are centres respectively of the cotton industries of the Bombay, Deccan and Berar. Other important cities are Hyderabad, the capital of the Nizam's Dominions and the centre of a considerable cotton trade. Allahabad is an important railway centre. Jaipur in the Indian State of the same name, is the chief commercial city in Rajputana and famous for its artistic pottery and brassware. Baroda, is the Capital of the Gaekwar's territory about 245 miles north-east of Bombay. Mysore the garden city of Southern India is famous for the manufacture of sandal-wood oil, silk, ivory and sandal-wood carving and incense sticks.

3. FOREIGN TRADE

While studying the foreign trade of India, one should never overlook the fact that India is mainly a producer of food and raw materials. This fact has been dominating our trade long since the seventh century B. C. In those old days we were trading with countries like Arabia, Syria & Egypt by sea. Overland trade was being carried on with Persia and Babylon. The exports mostly composed of muslins, spices and precious stones. The sea-borne trade decayed considerably during the Muslim period but land trade *via* the North-Western passes greatly developed. During the 17th century many European nations competed for Indian markets but the English came out successful and the East India Company took sole charge of the Indo-British trade. The opening of the Suez Canal in 1859 marks an epoch in the development of our foreign trade. It brought England nearer by about 3000 miles and both the exports and imports began going up steadily. Exports went up from Rs. 60 crores in 1873 to 224 crores in 1913-14; while the imports also went up from Rs. 33 crores to Rs. 151 crores. Now during normal years our foreign trade amounts to about 400 crores*. Only 10 per cent of our entire trade is foreign. Although the trade figures are quite high and India stands fifth in the world, the high population figures keep its *per capita* figure almost at the bottom.

The chief characteristics of our foreign trade are :—

(1) More than 90 per cent of it is sea-borne; carried on through the few Indian ports chiefly :—

(a) Bombay	Rs. 150 crores per year
(b) Calcutta	" 141 " "
(c) Karachi	" 62 " "
(d) Madras	" 34 " "
(e) Cochin	" 15 " "
(f) Chittagong	" 13 " "
(g) Tuticoria	" 10 " "

(2) India's imports mainly consist of manufactured goods as is evident from the following table :—

	Value	Percentage
Manufactured goods	Rs. 93 crores	61
Raw materials	Rs. 37 crores	21
Food	Rs. 24 crores	15
Others	Rs. 5 crores	3

(3) Her exports comprise mainly of raw materials, semi-manufactured goods and food as is given in the following table :—

	Value	Percentage
Raw materials	Rs. 76 crores	45
Semi-manufactured	Rs. 50 crores	30
Food	Rs. 40 crores	23

*In 1941 the total was about Rs. 343 crores, but certainly this cannot be called a normal year with a war going on, with India as an active participant.

(4) Normally there is every year a favourable balance of trade*, which is a necessity for India in that we are to pay out annually heavy charges to foreigners as *Home Charges*, interest and profits on foreign investment in India and other sundry payments. U. K. is our best customer as well as supplier, but normally we purchase more from U. K. than we sell her but in the case of other countries we sell more than we purchase and as such our balance of trade is very favourable. Our average for five years ending 1938-39 was +41. During the war owing to huge exports and low imports it even went up as high as +80 and even +85.

(5) The entrepot trade is of great importance. It amounts to about Rs. 15 crores (and includes articles imported only to be re-exported to the countries bordering India—Nepal, Afghanistan, Tibet, Shan States and Western China). The main items of export to these places are shown in the following table—

Cotton piece-goods	... 37 crores of rupees
Cotton twists and yarn	... 1 "
Metals and manufactured goods	2 "
Grains and pulses	... 1 "
Sugar	... 1 "
Oils	... 15 lakhs of rupees
Railway Material	... 65 "

The trade with our neighbours is usually carried on through the ancient trade routes in the north-western highlands of India—Khyber Bolan, Khuram and Gomal passes. The Nepalese railway system connects with the Indian system at Raxaul and this has brought about a great expansion in the trade between the two countries.

India's trade relations are more intimate with the United Kingdom than with any other country. In the year 1938-39 (it was a very normal year), India got Rs. 46 crores of imports from U. K., this means that U. K. was responsible for about 30 per cent of our total imports. In the same year our exports to U. K. amounted to Rs. 55 crores i.e., about 35 per cent of the total exports. The total trade with U. K. comes upto about 33 per cent of the total foreign trade of India.

The British Empire† accounts to about 60 per cent of our imports and about 55 per cent of our exports. During the war years, the exports naturally increased to about 70 per cent while the imports decreased to about 45 per cent. The following table gives details about our trade‡ with the empire.

*Difference between exports and imports.

†Including U. K.

‡Excluding re-exports.

	<i>Imports</i>	<i>Exports</i>
	<i>Lakhs of rupees.</i>	
Burma	... 23,35	10,03
Ceylon	... 1,18	5,09
Australia	... 2,41	2,97
Canada	... 91	2,14
South Africa	... 35	1,49
Others	... 12,87	8,14

Amongst other countries U. S. A. (978 lakhs of rupees worth of imports and Rs. 13.18 lakhs of exports), Japan (15.41 lakhs of rupees worth of imports and Rs. 14.59 lakhs worth of exports) and Germany are our chief trade allies. Iran, Egypt and others are also having some trade with us. The following may be studied to some advantage (1838-39).

<i>Imports</i>			<i>Exports</i>	
Country	Value in 1000 of Rs	Percentage	Value in 1000 of Rs.	Percentage
U. S. A.	977,83	9.7	13,88,00	12
Japan	15,41,34	11.7	14,59,02	9
Germany	12,92,73	9.7	8,55,49	4.7
Iran	3,48,84	2.5	78,37	.2
Egypt	2,18,89	1.5	1,22,50	.5
France	1,40,14	.9	6,19,18	.4

Till the eighties of the last century, the empire practically monopolised the imports into the country. Only about 7 per cent came from outside. U. K. alone was responsible for about 82 per cent. In the case of exports, however, the empire did not stand so high—only about 60 per cent was its share. U. K. took only about 45 per cent of our exports. During the present century a number of European countries especially Germany have come into the field as keen rivals. In 1914 about 60 per cent of our exports went to non-empire countries. U. K. got only about 25 per cent.

Between 1918 and 1939, the position of U. K. and other empire countries became even worse in spite of the so-called policy of Imperial Preference and the famous Ottawa Agreement both of which aimed at increasing the share of the countries within the British Empire. U.S.A.'s share was more than doubled.

The second Great War meant the cessation of trade with the continent and later on with Japan, Burma and other occupied countries. The relative share of the empire countries has increased. That of U. K. has steadily gone down. U. S. A. gained its share which came up to 20 per cent. in 1941-42. Imports for the surrounding countries increased particularly from Egypt and the Middle East countries. Iran alone accounted for 16 per cent of our imports.

*More particularly Ceylon, South Africa and Australia.

Imports

The total imports during 1932-33 amounted to Rs. 133 crores, the chief items being cotton and cotton goods (Rs. 34 crores), machinery, (Rs. 11 crores), oils (Rs. 8 crores), metals and ores (Rs. 10 crores), automobiles (Rs. 4 crores) and sugar (Rs. 9 crores). The *per capita* rate is Rs. .38 for imports. The following table gives the pre-war and war import figures (in thousands of rupees) of certain important items

	1925-29	...	1912-13
A Food, Drink and Tobacco	2,400.55	..	7,61.71
Grain, pulse and flour	1,575.48	...	30.85
Tobacco	1,01.55	...	1,34.19
B Raw materials and Produce	28,11.46	...	51,91.84
Oils	15,62.41	...	27,78.12
Cotton	8,50.92	...	15,42.48
Silk	62.17	...	1.73
Wool	62.11	...	2,95.50
Wood and timber	258.06	...	16.24
C Manufactured Goods	1,52,32.58	...	1,10,44.83
Chemicals and drugs	5,62.05	...	6,20.09
Cutlery, etc.	5,81.48	...	3,25.32
Machinery	19,72.48	...	10,52.60
Iron and steel goods	6,65.62	...	2,77.15
Paper and goods	3,84.97	...	2,15.67
Rubber goods	1,40.57	...	.....
Vehicles	6,69.20	...	5,71.83
Cotton including yarn	14,15.27	..	1,33.71
Silk	1,31.92	...	.....
Woollens	2,19.78	...	.....

Imports analysed :—*Cotton goods and yarn* comes chiefly from United Kingdom and Japan—32 per cent and 55 per cent respectively during pre-war years. During the war imports were stopped from Japan and those from U. K. came in very low quantities. China is also responsible for about 7 per cent. Other countries involved are Holland, France, Italy, Germany, U. S. A. and Switzerland.

The chief items of import are cotton piecegoods (70%), twist and yarn (10%), hosiery, millinery, thread and blankets.

With the increase in the production of cotton goods in India, the imports have been gradually going down. The imports of cotton piece goods in 1936-37 were one-fourth of those in 1913-14 and more than half of this came from Japan. In 1936-37 the *per capita* consumption was 15.53 yards out of which only 2.13 yards were of foreign origin. In the post-war years, the imports may be further reduced as local production is bound to go up tremendously.

Iron and Steel Goods :—(a) *Machinery and millwork* form important items of imports amongst iron and steel goods. More than 15 crore rupees worth of these goods are imported into India every year. The United Kingdom is alone responsible for more than 60 p. c. of these goods. Next come Germany (pre-war) with its 15 p. c. share ; U. S. A. (8 p. c.), Japan. (3 p. c.), and Belgium (2 p. c.) were other suppliers. Belgium is, however, our best supplier of steel, while U. K. and U. S. A. supply iron. 80 per cent of machinery about 90 per cent of rolling stock and railway plant and more than 40 p. c. of hardware come from U. K. and U. S. A. Large supplies of mill machinery come from U. S. A.

The imports of machinery have ever been on the increase, which is a sure sign of our rapid industrial development. It is, however, desirable that our dependence on foreign countries with regard to the supply of capital goods were reduced. Small beginnings have already been made in this direction in the country.

(b) *Vehicles* valued at about Rs 7 crores were imported into India in 1936-37. The average for 1927-28 to 1936-37 was Rs. 5.80 crores. The supplies included motor-cars, omnibuses, cycles, carriages and wagons. United Kingdom, U. S. A., Italy and Germany were our most important suppliers.

(c) *Metals and Ores* are also imported. In 1936-37, 363,000 tons of iron and steel were imported. This shows a vast decline from 1909-10 to 1913-14 average about 808,000 tons. 221,000 cwts of copper were also imported in 1936-37. This too shows a decline as in previous years as much as about 500,000 cwts were imported. Most of these imports come from Great Britain, Germany and U.S.A.

Oils also form an important item of import. About Rs 8 crores worth of oil was imported in 1936-37. Out of this about Rs. 6 crores worth were mineral oils. Most of our petroleum comes from Burma. During pre-war years Burma sent us about 60 p. c. of our petroleum imports. Other suppliers were Iran (15 p. c.), Borneo (13 p. c.) and U. S. A. (7 p. c.) The following table (as quoted by Dubey) shows the details of our oil imports :

Kerosene oil	... Rs. 3.82 crores
Fuel oil	... " 2.08 "
Lubricating oil	... " 1.67 "
Petrol (special)	... " 0.31 "
Coconut oil	... " 0.56 "

An Analysis of Our Chief Exports.

The chief items of exports are :

1. Cotton (raw and manufactured)
2. Tea.
3. Jute (raw and manufactured).
4. Hides and skins.
5. Oil seeds.
6. Grains.
7. Lac and Shellac.

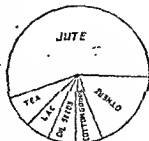


Fig. 52. Exports.

More than 30 per cent of the above-mentioned exports go to Britain. Then come :—

(1) Japan	... 15 p c.
(2) U. S. A.	... 10 ..
(3) Germany	... 5 ..
(4) France	... 4 ..

(1) Cotton is exported both raw and in the shape of piece-goods, twist and yarn and other cloth.

More than 50 per cent of our raw cotton went to Japan. The pre-war export of raw cotton was reported to be about Rs 43 crores worth. Then comes United Kingdom with its 17 per cent. The following table shows other customers :—

U. S. A	... 3 p. c.
Germany	... 5 ..
France	... 7 ..
Italy	... 4 ..
Belgium	... 5 ..
China	... 20 ..*

Most of our raw cotton went out via Bombay and Karachi. Calcutta was not very far behind.

Bombay	... 50 p c.
Karachi	... 29 ..
Calcutta	... 29 ..

It is interesting to know that even in pre-war years the cotton consumption in the Indian mills was steadily increasing.

1933-34	... 2,289,930 bales of 400 lbs. each
1934-35	... 2,553,440 .. " "
1935-36	... 2,609,378 .. " "
1936-37	... 2,612,024 .. " "

The details of the exports of manufactured cotton are :—

Piece-goods	... 3.29 crores of rupees
Twist and yarn	... 1.18 .. " "
Cotton waste	... .48 .. " "
Handkerchiefs	... .28 .. " "

Our annual production of piece-goods is about 3,500 million yards ; out of this about 102 million yards were exported in 1936-37 as compared with a mere 71 million yards in 1935-36. The Indian piece-goods mostly go to Ceylon, Iran, the Straits Settlements, Iraq, Aden, Arabia, Malay States and the Anglo-Egyptian Sudan.

Our chief customers of twist and yarn are Syria, Iraq, the Straits Settlement, Aden and Cyprus.

(2) Tea is another important item of export. Out of the total production of 400,000,000 lbs. of tea, about 77 per cent was exported in 1936-37. Great Britain is our best customer, taking 276 million lbs out of the total exports of 313 million pounds. Our other customers are Canada, U. S. A., Australia and New Zealand.

*Average of 1935-39.

Calcutta is the most important tea-exporting port of the country, clearing more than 60 per cent of the exports. Other ports important for the same are Chittagong (24 p. c.) and Madras (16 p. c.)

(3) Jute is also an import item of our export trade. The total exports of raw and manufactured jute in 1936-37 were about 1,792,000 tons valued at about Rs. 43 crores.

The amount of raw jute exported is estimated at 821,000 tons valued at Rs. 14,77 lakhs. Our best customers of raw jute in 1939 were :—

U. K.	... 37.2 p. c.
Germany	... 4.6 "
U. S. A.	... 10.2 "
Belgium	... 5.0 "
Italy	... 6.9 "

Other customers are Spain, France, Argentine, Japan and Canada.

On account of some substitutes being used in U. S. A. and other places, the exports have been showing a downward tendency.

(4) Hides and Skins may also be mentioned as important items exports from India. In 1936-37 about 78,600 tons were exported. The average export of raw hides and finished leather was worth about Rs. 4.35 crores. The average annual export of raw and tanned skins* amounts to about 4.32 crore pieces valued at Rs. 5.79 crores i e., India contributes 22.7 per cent of the total number of skins involved in the world trade.

The United Kingdom is our largest consumer, taking more than 60 per cent of the total. Other customers are U. S. A., Germany, Japan and France.

(5) Oilseeds are yet another item of Indian exports. About 1,155,000 tons valued at Rs. 18 crores were exported in pre-war years. The chief items were :—

Groundnuts	... 11 crores of rupees
Linseed	... 3.4 "
Castor	... 1.47 "
Linseed cake	... .51 "
Groundnut-cake	... 1.30 "
Rape seed	... .88 "
Rapeseed-cake	... .30 "

Britain is our best customer and buys about 33 per cent of our total exports. Other customers are (1937).

Italy	... 13.3 p. c.
Germany	... 12.0 "
France	... 10.0 "
Belgium	... 5.0 "
U. S. A.	... 1.4 "

* Both goat and sheep skins but mostly goat.

With the development of the oil-seed crushing industry in the country, our internal consumption has been going up and our exports are on the decrease. The decrease is also seen into effect because of the supplies of oil-seeds from Brazil, Argentine and the Union of South Africa.

(6) Grains and flour may also be mentioned. In 1936-37 the total value of exports under this head was Rs. 1538 lakhs. The items included were :

- (1) Husked and unhusked rice.
- (2) Wheat and wheat flour.
- (3) Pulses.
- (4) Barley.
- (5) Millets.

A larger percentage of our food grain exports go to the United Kingdom, Ceylon, the Strait Settlements, Japan and Germany. Australia, Canada, U. S. A. and Argentine are our formidable competitors in the world markets.

(7) India enjoys a monopoly in the export of lac and shellac as has already been pointed out in the section on 'Lac Industry'. The exports in 1936-37 amounted to about 80,000 cwts. Owing to formidable competition from a number of artificial products, the exports show a gradual decrease. More than 30 per cent of the exports pass through Calcutta. Our best customers are U. K., and U. S. A. Germany and Japan also purchase quite large quantities.

LAND-BORNE FOREIGN TRADE

The Indian land frontier in the North-West and North-East is about 6000 miles long but owing to high and difficult mountains and dense forests, the traffic is restricted to only a few passes specially in the North-West. It is through these routes that the bulk of our land-borne Frontier trade is carried on. The value of this trade is estimated to be about 40 crores of rupees and it is on a gradual increase. The countries involved in this trade are the adjoining countries of Nepal, Tibet, Shan States, Western China, Thailand (Siam), Afghanistan and Central Asia and Persia. The chief items of export are cotton and cotton goods, food-grains, iron and steel and goods, petroleum, sugar, salt, tea and tobacco, hides and skins, fruit and vegetables.

It is expected that with better means of communication, this category of our foreign trade will go up tremendously both in volume and in value.

RE-EXPORT TRADE

Re-export trade usually consists of those items of special foreign production, which because of geographical situation or trade organisation, are halted at an intermediate station to be re-exported from

there*. The value of this trade in India is about 15 crores of rupees.

1938-39	... 6.5 crores
1939-40	... 9.5 "
1940-41	... 12.0 "
1941-42	... 15.3 "
1942-43	... 7.0 "
1943-44	... 11.0 "

Re-export has long been an important feature of Indian commerce because primarily of its geographical situation because of which it is easily accessible from the West and also from the Far East. About 50% and more of our re-export trade is carried on with some of the neighbouring Asiatic countries. The chief items of this trade are fish, fruit, food-grains, tea, sugar, ammunition, drugs and chemicals, machinery and railway goods. The bulk of this trade passes through Bombay (78 p. c.), Karachi (12 p. c.) and Calcutta (6 p. c.). The following table shows percentage share of various countries :—

U. K.	... 49
U. S. A.	... 11
Ceylon and Aden	... 5
Japan	... 4
Iraq	... 4
Arabia	... 3
Iran	... 3
Kenya Colony	... 3

OCEAN TRADE-ROUTES AND PORTS

The chief sea routes of India are

- (1) The Suez Route from and to the West.
- (2) The Singapore Route from and to the Far East.
- (3) The Australian Route (to Brisbane, Sydney and Melbourne).
- and (4) The South African or the Cape Route†.

All of these sea-routes radiate from the four Indian ports *i. e.*, Bombay, Karachi, Madras and Calcutta.

The greatest innovation in our sea travel has been the opening of the Suez Canal in 1869, before the opening of which, all the traffic between India and the West was carried on *via* the Cape of Good Hope in the extreme south of South Africa. The opening of the Suez Canal has brought Bombay nearer to Liverpool by about 4,541 miles and nearer to New York by about 3,409 miles.

The Suez Canal is 104.5 miles in length and as such it is the longest ship canal in the world. It connects the Red Sea with the Mediterranean and passes through two salt lakes. The canal has a minimum depth of 36 feet and the minimum bottom width of 100

*Shah, K. T., *Trade, Tariffs and Transport*—p. 93.

†Some ships go on to South America *via* this route.

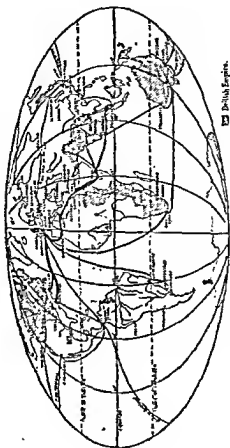


Fig. 53. Ocean Routes.

British Empire.

feet ; as such there is only one way traffic for bigger ships and they pass through in turns. It takes about 14 hours to cross it as the ships have necessarily to go slow.

More than 6000 vessels of all description pass through the canal in a year ; about half of these being British for the simple reason that India, Australia and other British possessions are in the East.

Ports. Besides the smaller ports described earlier in this book, India has four major ports *s.e.* Calcutta, Madras, Bombay and Karachi that handle about 90 per cent of our foreign trade. Bombay and Calcutta together account for about 65 per cent.

The following table, showing exports and imports of the chief Indian ports, may be useful to learn :—

		<i>Imports</i> (in 000 rupees)	<i>Exports</i>
Bombay	...	70,56,70	76,67,21
Calcutta	...	53,05,09	106,72,03
Karachi	...	15,64,29	19,79,03
Madras (Fort St. George)		14,70,07	15,71,17

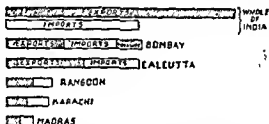


Fig. 54. Exports and Imports.

Bombay along with Karachi controls practically the entire length of the Western Coast and the entire foreign trade of N. W. and Western India is carried on through these ports.

The port of Bombay owes its great importance both to its suitable geographical situation—it is the first Indian halt on the Suez route from the West—and to its magnificent natural harbour having a good minimum depth (32')* and a safe landing place. Its importance as an industrial and commercial centre rapidly went up after the construction of the G. I. P. and the B. B. and C. I. railways which linked it up with the cotton fields of the Deccan and with the cotton and wheat fields of the Punjab and U. P.†

‡ The present Bombay harbour situated on the sheltered side of the island of Bombay, is about 14 miles in length and about 5 miles in width. The harbour contains three wet and two dry docks.

* Indeed equal to the maximum available in the Suez Canal.

† The extreme range of tide is 18 feet and 7 inches; and the range between high and low tides is 12 feet.

‡ The total floor area of the sheds is 2,500,000 square feet.

Wet	1. Prince's Dock with a water area of 30 acres and 14 births.			
	2. Victoria Dock	"	25	" 16 "
	3. Alexandra Dock	"	49½	" 23 "
Dry	4. Merewether	"		
	5. Hughes	"		

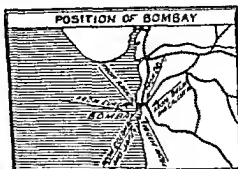


Fig. 55.

The port handles about five million tons of cargo annually. The Port Trust Railway handles about 50 per cent of the rail-borne traffic of Bombay. This railway is only about 7½ miles in actual length but contains about 120 miles of main lines and sidings. The Cotton Depot and the Grain Depot are important items to be described. The former covers an area of about 127 acres and as such claims to be one of the largest in the world. The latter lies to the east of the former across the Port Trust Railway. It covers an area of 80 acres. Besides these, there is a number of smaller depots for coal, manganese ore etc.

Bombay is the main outlet for the products of Western India—more particularly raw cotton. The cotton goods of the mills in the Bombay Presidency are also sent out from here. Because of its excellent railway (Broad Gauge) connections, it also attracts products that 'geographically' fall within the control of Karachi. Besides, being the nearest port of call for the steamers from the West, it is also the most convenient centre for vessels coming from East and South Africa. During the present war the port has gained importance as a military base and it is expected that this will be maintained as a permanent feature.

It may, however, be interesting to note that although now Bombay claims to be the number one port of India, it was second to Calcutta only two decades and a half ago *i. e.*, upto the last Great War. Since then, however, it has rapidly gained in importance owing mainly to her increasing industries.*

*In 1939 the total foreign trade of Bombay was Rs. 150 crores worth as compared to 130 crores of 1939.

The following tables show the 1934-35 import and export figures of Bombay :—

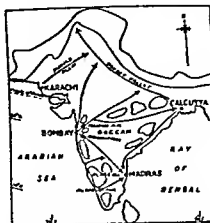


Fig. 56. Chief Ports of India.

A. Imports

Coal	...	197,000 tons
Cotton	...	741,000 bales of 400 lbs. each
Hardware	...	20,000 tons
Iron and Steel	...	80,000 "
Machinery, railway goods etc.	...	91,000 "
Oil, fuel	...	49,800,000 gallons
Kerosene oil	...	46,379,000 "
Piece-goods	...	326,000 bales
Twist and yarn	...	101,600 "
Glassware	...	119,000 packages
Automobiles	...	18,000 "
Paper etc.	...	243,000 "
Wines etc.	...	1,479,000 gallons

B. Exports

Raw cotton	...	1,924,000 bales
Grain	...	187,000 tons
Ground-nuts	...	80,000 "
Hides	...	2,000 "
Iron	...	35,000 tons
Manganese	...	54,000 "
Piecegoods	...	364,000 bales
Seeds	...	254,000 tons
Twist and yarn	...	105,000 bales.

Karachi is the second important port of Western India. Its rise to importance, however, is quite recent. It was only since 1907 that it was recognised as a major port. The opening of the

Lloyd Barrage in 1932, has given it a further push forward. As has already been mentioned in the chapter on 'Air Transport', since 1929 when air services were established between India and some foreign countries, Karachi has become gradually a very important airport and is steadily heading towards the top position in this matter.

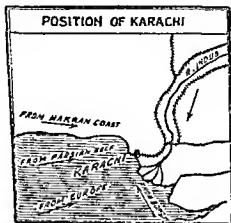


Fig. 57.

Karachi's position (see Fig. 57) makes it the natural outlet for North-West India specially Sindh and the Punjab. One good point in its favour is that it is situated outside the delta of the Indus away from the place where silt is deposited and as such the harbour is always clear and no extensive dredging is resorted to. The North-Western Railway provide transport facilities with its hinterlands which are famous for wheat, cotton and fruit.

Karachi's expansion, however, has been considerably held up because of (1) superior attractions of Bombay, (2) no broad-gauge communications with the United Provinces, (3) absence of industries and (4) limited water-supply.

Karachi is, however, the 'wheat port' of India and its dry and bracing climate is good for storage. Dr. Vera Anstey remarks*, "It is interesting to note that in 1926 more than one-half of Karachi's exports were shipped by foreign vessels (*Times*, May 24, 1927). Apparently British shippers neglect Karachi's potentialities".

In 1939-40, about 10,727 ships weighing about 5,155,000 tons visited this port. The total value of trade is about Rs. 34 crores. The following table gives the trade figures for 12 years from 1923-24 onwards.

*Anstey, *The Economic Development of India*—p. 151.

†The deficits in the years 1931-32, 1932-33 and 1933-34, were due to slump in trade caused by the world economic depression. The years 1934-35 showed a welcome improvement.

Years.	Import.	Export.
	£	£
1923-24 ...	25,615,237	34,261,255
1924-25 ...	30,361,640	42,811,673
1925-26 ...	26,931,043	29,096,454
1926-27 ...	28,464,907	21,822,520
1927-8 ...	31,252,326	26,109,315
1928-29 ...	32,971,312	25,343,802
1929-30 ...	29,632,150	23,007,750
1930-31 ...	25,977,312	17,450,473
1931-32 ...	32,154,320	14,703,654
1932-33 ...	19,975,062	18,254,487
1933-34 ...	16,634,442	15,155,730
1934-35 ...	18,783,054	18,309,946

The following table gives Karachi's main imports and exports.

Imports	Exports
Cotton goods ...	Wheat.
Sugar ...	Wool
Metals ...	Hides and bones
Machinery ...	Cotton
Oil ...	Oil-seeds
Woollen goods	
Liquors and wines	
Chemicals and drugs	

Madras.* Madras is situated near the south-east corner of India at a distance of about 759 miles from Calcutta, 1,453 miles from Bombay and about 1,915 miles from Karachi. Colombo in Ceylon is about 580 miles away. It can be easily seen from any map that its position puts it in a very favourable position for trade with Burma, Malaya and the Far East and also with Africa and Australia.

It is interesting to learn that though Madras has always been a port, it is not a harbour. It has now an artificial harbour (Fort St. George) which is now visited by 1,416 vessels, weighing about 5,104,000 tons, every year. The harbour, as it is today, consists of two concrete works projecting into the sea, enclosing a sea space of about 200 acres, capable of accommodating about 14 ships. The harbour boasts of seven wharves, and mooring berths, an area of about 16 acres is covered by warehouses.

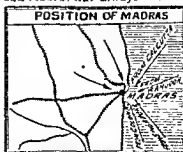


Fig. 58.

* 'Port of Madras' by G. G. Armstrong. The Journal of Madras Geographical Association—Vol. XIV No. 1, 1939—has been freely used in this section.

The harbour is connected with the broad-gauge system of the Madras and Southern Mahratta Railway on one side and the metre gauge system of the South Indian Railway on the other side. Railway sidings are amply provided for sheds and quays, so that cargo may be discharged into or out of railway wagons directly by steamers.

Madras handles imports worth Rs. 14,70,07,000 and exports worth Rs. 15,71,17,000 every year. The following table shows the chief imports and exports of this port.

<i>Imports</i>		<i>Exports</i>
Rice	...	Ground-nuts
Foodgrains	...	Skins and hides
Coal	...	Onions
Oils	...	Tobacco
Paper and stationary		Raw cotton
Sugar	...	Ores
Timber	...	Scrap iron
Chemicals	...	Kerb stones
Glass-ware	...	Cotton goods
Machinery	...	Oil cakes
Motor vehicles etc.		Coffee
Cotton goods	...	Manures
Rolling stock	...	Turmeric

Calcutta (22° N and 88° E) is situated on the Hoogly in Bengal at a distance of about 80 miles from the shore. Besides being a very important port, Calcutta is also the premier city in India and was upto 1911 the Imperial capital. Like other estuary ports, shipping here is at the mercy of the tides. Ships can come and go only at certain fixed times according to the timings of the tides. The sand bars* in the river determine the size of the ships.

Calcutta stands at the head of the Indo-Gangetic Plain which is not only the most fertile and economically important region of the country, but which is also the most densely populated area in India.

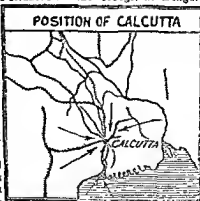


Fig. 59.

*The following bars etc are encountered on the way to the sea :—Panchpore crossing, Sankrail crossing, Munikholi crossing, Fir Seraog crossing, Poojab crossing, Mayapur Bar, Rayapoor crossing, Fula crossing, the James and Mary Bar, the Saugor crossing and the Middleton Bar.

The port serves the great jute, tea and coal industries of the eastern half of the Gangetic plains, as also the wheat and cotton traffic of Bihar and United Provinces. The East Indian Railway, the Bengal Nagpur Railway and the Eastern Bengal Railway all combine to connect Calcutta with its rich hinterlands. The Ganges and the Brahmaputra and their tributaries provide splendid natural waterways connecting the delta with the interior of Bengal and Assam.

The port extends for several miles along the banks of the Hoogly. It is well served by the port railway which has 170 miles of permanent way and connects with all the main railway systems serving Calcutta. A number of jetties, docks and moorings exist where vessels can discharge. The Kidderpore Docks, the King George's Dock and the Dock No. 1 and 2 may be mentioned amongst the chief wharves. The Garden Reach Jetties are the latest additions to the port. A number of Dry Docks are also available for the use of shipping. Extensive warehouse accommodation is available in the port—2 sea warehouses and a number of public sheds and a grain and seed-depot.

In 1939-40, 2 968 vessels of all descriptions weighing about 9,061,000 tons visited the port. In 1938 the port carried on trade upto the value of about Rs. 140 crores, out of which exports were valued at Rs. 85 crores and imports at Rs. 55 crores. The following two tables taken from the Handbook of Commercial Information for India (1937) give the details of exports and imports for the year 1934-35. They are given just to show the general trend and not to give the latest figures.

TABLE A

Imports

<i>Item</i>	<i>Quantity or value</i>	
Cotton Piecegoods	yds.	497,534,056
Metals and ores	tons.	175,702
Oils	gals.	109,627,312
Machinery and millwrok	£.	3,306,562
Chemicals etc.	cwts.	1,388,186
Hardware	£.	758,111
Insrtuments etc.	£.	1,285,553
Provision and oils	cwt.	327,591
Paper and paste board	cwt.	868,000
Motor vehicles	Nos.	4,433
Woollen goods	£.	555,844
Liquors	gals.	1,234,064
Rice	tons.	572,280

TABLE B
Exports

<i>Item</i>	<i>Quantity or value</i>
Jute manufactures	tons. 798,863
Jute, raw	tons. 715,778
Tea	tons. 98,922
Cotton, raw	tons. 6,122
Rice	tons. 106,861
Pulses	tons. 41,956
Raw hides and skins	tons. 25,282
Lac	tons. 19,005
Manures	tons. 30,918
Coal	tons. 2,085,107
Seeds	tons. 111,618
Pig iron	tons. 47,046
Manganese	tons. 208,43
Mica	tons. 4,689

CHAPTER XIII

POPULATION

A : A STUDY OF THE INDIAN CENSUS*

India is essentially agricultural in the distribution of its population. Historical and social conditions are also factors that

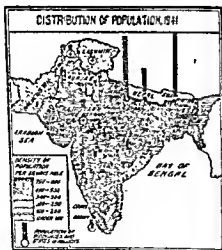


Fig. 60.

(After Lorenz)

*A census of India is taken every 10 years. The last one was taken in 1941. War conditions and financial considerations did not allow the operations to go their full course or the tables to be completed, yet the very undertaking of the task at such a time shows the very great importance of the thing.

determine the population of a country, but as far as our country is concerned agriculture seems to be the major consideration, while just the opposite is the case in England, which is industrial in appearance, in outlook and in the distribution of population.

The population of our country stands at a high level, nearly $\frac{1}{4}$ of the total world population is found in this country. Its population according to the census of 1931, was about 350,000,000 (Three hundred and fifty million)-British territory 270,000,000 and Indian States 80,000,000. The total population of India, according to the 1941 Census, is 388,997,455 souls, of these 93,189,233 live in Indian states and 295,808,222 in British provinces. The total area of India (excluding Burma) is 1,581,410 square miles. Statistics of the total population, according to political divisions are given below.

Areas and Populations.

	Area (sq. miles)	Population
All India	1,581,410	388,998,000
Assam	54,951	10,205,000
Bengal	77,442	60,307,000
Bihar	69,745	36,340,000
Bombay	76,443	20,850,000
C. P. and Berar	98,575	16,814,000
Madras	126,166	49,342,000
N. W. F. P.	14,263	8,038,000
Orissa	32,198	8,729,000
Punjab	99,089	28,419,000
Sindh	46,136	4,535,000
U. P.	106,247	55,021,000
Hydrabad	82,313	18,339,000
Mysore	29,453	7,329,000
Kashmir	82,258	4,022,000
States (total)	715,964	93,189,000

Increase in Indian Population. During the last 50 years the population of India has grown by 110 millions as is clear from the tables below :—

TABLE A

POPULATION IN INDIA (MILLIONS).

	1891	1931	1941	Percent increase since 1891
Total	279	338	389	39
British Provinces	213	257	296	39
Indian States	66	81	93	40

Let us examine geographically the causes that have been responsible for the rapid growth of numbers during the last 20 years or so.

(a) The new irrigation schemes in the Punjab have thrown open considerable semi-desert areas to new colonization. The process started from almost zero, and is going on at a remarkable speed. The same was the fortune of the U. S. A. and Canada when the human tide first flowed in from Europe. The new colonies in the Bikaner State have attracted the Sikh farmer who has been responsible for a 40 per cent increase. Bahawalpur has fared similarly. In Western Bengal with increased agricultural capacity the numbers have multiplied rapidly.

(b) The 1931 Census was taken during a period of political disturbances. The Civil Disobedience Campaign was responsible for leaving many persons unregistered. The leakage was the greatest in North India. All that slack has been caught up, hence the greater increase in density in North India.

(c) In 1941 the country as a whole was census conscious and no one wanted to be missed in the count. In fact, it has been suspected that misjudged communal enthusiasms vitiated enumeration and exaggerated figures were supplied in certain urban areas. The house lists were used for comparative corroboration and "sound enough results were obtained" in spite of the difficulties.

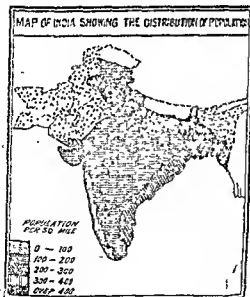


Fig. 61.

TABLE B

Percentage variations from decade to decade

1891—1901,	1901—1911,	1911—1921,	1921—1931,	1931—1941,
+1.5	+6.7	+0.9	+10.6	+15

TABLE C

INCREASE IN RING 1931—41

Madras	11.6 p. c	C. P.	9.8 p. c
Bombay	15.8 "	Assam	15.3 "
Bengal	20.3 "	Orissa	8.8 "
U. P.	20.5 "	N. W. F. P.	25.3 "
Punjab	20.5 "	Sindh	16.7 "
Bihar	12.3 "	Baluchistan	8.2 "

It will be seen that the growth of population from decade to decade has been slow and irregular, the governing factors have been famine or epidemics. Their prevalence has been a restraining influence and their absence responsible for a substantial increase. Between 1891 and 1901 the twin factors of plague and famine checked a rapid growth in numbers. The decade 1901—1911 experienced a fair degree of agricultural prosperity and thus registered a higher increase. The prospects of increase in the next decade (1911—1921) were marred by influenza which raged in an epidemic form. But for this calamity which is estimated to have taken a toll of 14 million persons, population in India would have considerably increased. It seems the increase in numbers during the first seven years of this decade was neutralised by this disease during the closing years. Since 1921, however, the population has increased at a very rapid rate. Nature seems to have been less unkind. Perhaps the methods of conquering epidemics have been perfected. Better irrigation facilities have mitigated famine conditions. A part of this may be attributed to increase in the area of census operations and improvement in the census methods. Even making an allowance for these factors the real increase in population seems to be fairly alarming. Although the census commissioner considered 7 to 8 per cent. for the decade as the rate of probable increase, to us however, 10 per cent seems to be the normal rate of decennial increase. Considering the huge size of our population, this rate is sufficiently perturbing. The increase has not been uniform in all parts of India, although higher rates are universal.

"Rates are noticeably higher in the north than in the south and have two extreme peaks in the extreme west and north-west and in the east. In fact, we have in the Punjab and Eastern Bengal two alarming areas. Both are comparatively young from the habitation point of view."

Let us examine geographically the causes that have been responsible for the rapid growth of numbers during the last 20 years or so.

(a) The new irrigation schemes in the Punjab have thrown open considerable semi-desert areas to new colonization. The process started from almost zero, and is going on at a remarkable speed. The same was the fortune of the U. S. A. and Canada when the human tide first flowed in from Europe. The new colonies in the Bikaner State have attracted the Sikh farmer who has been responsible for a 40 per cent increase. Bahawalpur has fared similarly. In Western Bengal with increased agricultural capacity the numbers have multiplied rapidly.

(b) The 1931 Census was taken during a period of political disturbances. The Civil Disobedience Campaign was responsible for leaving many persons unregistered. The leakage was the greatest in North India. All that slack has been caught up, hence the greater increase in density in North India.

(c) In 1911 the country as a whole was census conscious and no one wanted to be missed in the count. In fact, it has been suspected that misjudged communal enthusiasms vitiated enumeration and exaggerated figures were supplied in certain urban areas. The house lists were used for comparative corroboration and "sound enough results were obtained" in spite of the difficulties.

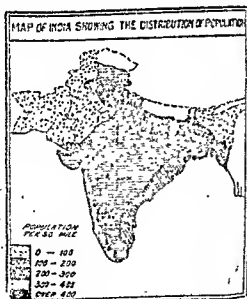


Fig. 61.

Density of Population. The number of persons per square mile varies from province to province and from state to state. We find such extreme variations as Baluchistan with 9 persons per square mile and Bengal with as many as 779.

Density of Population.

All India	..	...	216
States	..	...	130
Madras	..	...	391
Bombay	...	...	272
Bengal	...	...	779
U. P.	...	...	518
Punjab	..	...	287
Bihar	...	...	521
C. P. and Berar	...	...	170
Assam	...	...	186
N. W. F. P.	...	...	213
Orissa	..	...	271
Sindh	...	...	94
Ajmer	...	...	243
Baluchistan	...	...	9
Delhi	...	...	1,599

Density is governed, in the first place, by climate. A healthy climate will attract more people and maintain the existing population. If climate happens to be unfavourable as is in Assam, the density will be low.

Secondly, the density of population depends on rainfall. If rain is adequate, timely, and evenly distributed, it will be highly conducive to the growth of numbers. But rainfall is not the only determining factor. In the Himalayan areas like Dehra Dun, Almora, and Simla, the rainfall varies between 60 and 85 inches in the year, yet the numbers per square mile are very few. Similarly in Assam where the rainfall is plentiful, the density is only 186. The same is true of Kashmir which has a density of only 49. The fact is that no single factor can explain the variations in density. It is only a happy combination of several factors which accounts for higher density.

Thirdly, the irrigation facilities which stabilise agricultural conditions lead to denser population. The canal colonies in the Punjab are much more densely populated than some of the other districts.

Fourthly, economic development leads to dense population and the absence of it accounts for sparse population. It is admitted that the number of people that can be maintained in the pastoral stage must needs be very small. In the agricultural stage larger numbers

can be supported. But in the industrial stage there is room for many more people. It is well-known that all centres of trade and industry happen to be the mostly densely populated. The higher density in Bengal is partly due to this factor and a comparatively lower density in the Punjab is due to the agricultural character of the province.

Fifthly, the nature of the soil also makes a difference. Regions with sandy soil show a lower density as compared with those with fertile soils. Rajputana for instance is very sparsely populated.

Sixthly, perhaps the most important single factor having a bearing on density is the configuration of the area. It is the shape of the surface of the earth which largely explains variations in density. The hilly and the mountainous tracts in the north-east or north-west are less densely populated than the level plains of the Punjab, U. P. and East Bengal. The level tracts afford greater facility for the exercise of economic activities and yield a larger fruit. India is mainly an agricultural country and density varies with agricultural conditions too.

To the above factors may be added a few more points as affecting the geographical distribution of population.

(a) *Rivers* affect the settlement through the water-supply, transport and floods. River valleys have since long been centres of population and civilization. The Indus and the Ganges valleys claim large populations more specially in their lower parts and in the deltas. The deltas of the rivers of the Deccan also have good numbers. The *khadar* lands or the regions liable to be affected by river floods are naturally thinly populated.

(b) *Forests* are areas of thin populations. The sundarbans and the plateau of Shillong are examples in India besides the forests of the Tarai.

(c) *Methods of cultivation* and the *crops* grown also have appreciable influence on the density of population. Intensive farming and the cultivation of wheat and good quality cotton are factors responsible for the increasing density in some of the colony districts of the Punjab.

In wet eastern India rice is the chief crop and its influence is clearly brought in Bengal, Bihar and in the eastern coastal plains as well as in C. P. where density increases along with an intensification in rice production as rice provides food for more people.

In drier parts of the country barley and jowar areas provide food for most people as their yields are higher than those of wheat. In areas of higher densities these crops are mostly grown resulting in the exclusion of wheat.

The cultivation of *cash crops* is also important from the population point of view. The farmer cannot do without them. It is, therefore, common that a high yielding food crop is always combined with a good cash crop (e. g., rice and jute in Bengal, wheat and

TABLE A (Towns)

Madras	407	N. W. F. P.	28
Bombay	185	Sindh	28
Bengal	149	Ajmer	5
U. P.	445	Baluchistan	12
Punjab	202	Coorg	2
Bihar	88	Delhi	9
C. P. & Berar	119	States & agencies	979
Assam	30	Orissa	17

TABLE B

POPULATION OF 10 LARGEST TOWNS

Calcutta	..	..	2,109,000
Bombay	...	...	1,489,000
Madras	...	...	777,000
Hydrabad	..	...	739,000
Lahore	...	...	672,000
Ahmedabad	...	...	591,000
Delhi	...	...	522,000
Cawnpore	...	...	487,000
Amritsar	...	...	391,000
Lucknow	...	...	387,000

Now let us turn to rural population that forms more than 80 p.c. of the total 88 p. c. to be exact. In the whole of the country there are about 655,892 villages with less than 5,000 persons. More than 500,000 villages contain population below 1,000 or even 500 persons. The following table shows the number of villages in individual provinces and states.

Madras	35,430	N. W. F. P.	2,828
Bombay	21,472	Sindh	6,583
Bengal	84,213	Ajmer	706
U. P.	102,383	Baluchistan	1,437
Punjab	35,269	Coorg	301
Bihar	68,869	Delhi	305
C. P. & Berar	38,985	States & agencies	196,501
Assam	33,560	Orissa	16,653

It will be seen from a study of the above table that about 50 per cent of the villages (and also the rural population) lie in the Indus and the Ganges valley—the Ganges valley being more important. The largest number of villages is found in U. P. The area shared by individual villages is naturally smallest in the Ganges valley—less than one square mile in Bengal and about four square miles in the Bombay Presidency specially in Coorg. In N. W. F. P. too it is about the same. The following table gives the average area of a village in some Indian provinces.

Madras	...	2.7 sq. miles
Bombay	...	4.3 "
Bengal	...	.8 "
U. P.	...	1.1 "
Punjab	...	2.3 "
Bihar & Orissa	...	.9 "
C. P.	...	2.6 "
Coorg	...	4.6 "
Delhi	...	1.6 "

*Village types. The Indian villages may be classified as† :—

(1) The scattered Homestead (Malabar, Bengal and Assam),

(2) Large compact villages (whole India),

(3) The hamlet or a collection of separate huts (not very important).

In determining the village type, the problem of water-supply is the most marked. Other determining factors are (1) land forms, (2) soil, (3) climate, (4) vegetation. Conditions of security; the current agrarian system, social, racial and religious ideas also play some part. Whenever the water-supply is plentiful, type No. 1 is the rule; while in places of limited water-supply as in the Punjab and western U. P., type No. 2 is more common. In areas of well-water concentration of people and compact settlements have resulted. In areas of heavy rainfall, there is no need for compactness of settlements. This is more prominent in Bengal and in Malabar and Travancore. In the peninsula compact settlements have to exist around tanks. In canal colonies of the Punjab and in the canal areas of U. P., regularly spaced settlements have grown up.

Agriculture, land-tenure and communications are other factors that determine the village patterns in India.

The agricultural unit in India is very small and compact villages are the natural result.

Except in Bengal and Assam, there is no permanent settlement of land tenure in the country and periodic revision has to be carried on. It is, therefore, only natural that except in Assam and Bengal, compact settlements have to be maintained for the purpose.

*We are indebted to "Environment and Distribution of Population." (By Dr. K. S. Ahmad—Indian Geographical Journal Vol. XVI No. 2, 1941) for information regarding this topic.

†The same as recognised in Europe.

In mountain and forest areas, people huddle close to railways and roads. In areas with cheap and abundant transport facilities, there is no such tendency in evidence.



Fig. 62.

	<i>Agriculture etc.</i>	<i>Mining and Industry</i>	<i>Trade and Transport</i>	<i>Others</i>
Great Britain	7.1	47.2	20.7	25
U. S. A.	22.0	31.7	24.5	21.8
Japan	50.3	19.5	20.2	10.0

One is struck by the most uneven distribution of our people over the various occupations. It simply reflects the lop-sided nature of our resources. If the economic development of the country had taken place in a sufficiently diversified manner our human resources would have shown a more balanced allocation.

Although 10 per cent are shown as being engaged in industry, only 1.5 per cent are accounted for by organised industry. When we know that less than one-fifth of our people are engaged in trade, transport and industry, we find a clue to Indian poverty. These are the most paying professions, and when the bulk of our people drift into unremunerative channels, poverty is inescapable. *Industrialise or perish*, should be our slogan. No amount of agricultural rehabilitation can pull us out of the mire of poverty.

The most distressing fact about our vocational distribution is that the overwhelmingly large number of the people are dependent on agriculture. Even Bengal, Bihar and Orissa, in spite of having developed certain industries, are predominantly agricultural and so are the Punjab and U. P. although a very large proportion of their population is returned as industrial labour. India shows the highest percentage of people in the world as depending on agriculture.

Agriculture is admittedly the least remunerative of occupations. Experience all over the world has shown that economic progress has always been marked by a diminution in the numbers engaged in agriculture and by an increase in those engaged in trade transport and industry. In England less than 10 per cent of the people depend on agriculture. Indian agriculture is a gamble in the rains

*44 p. c. of the total or 171 million is the working population.

and, therefore, always uncertain of success. It is subject to the law of diminishing returns. It is a seasonal occupation and subjects our people to enforced idleness for several months in the year. Exclusive dependence on agriculture is an index of unbalanced economy and is one of the most important causes of poverty. This situation needs immediate rectification. As long ago as 1880 the Famine Commission issued a warning about the dangers of this situation.

It may be noticed that from census to census the vocational distribution has remained practically the same. There has been no fundamental change in this respect during the last 25 years or so. A slight increase is observable in the number of persons engaged in transport which is due to the development of motor traffic and also in those engaged in liberal professions which may be attributed to advance in literacy. It is time that we made conscious and vigorous efforts to bring about a more even distribution of the people over the various occupations and overcome this economic stagnation.

Movement of population. (a) *Within India* :—

Within India, movement is small, but it plays an important part in the economy of certain areas. Internal migration is of five kinds.

(i) Casual, between neighbouring villages to visit relations or on casual business.

(ii) Temporary, to visit fairs, to work as coolies, to visit places of religious worship, etc.

(iii) Periodic or seasonal, to reap harvests, to graze sheep on the higher ranges of mountains in the summer, etc.

(iv) Semi-permanent, to earn a livelihood at distant places always with the idea of coming back e.g., to labour in factories in Bombay and Calcutta or to serve as domestic servants in the cities.

(v) Permanent, e.g., to settle in the canal colonies in the Punjab.

The tea gardens in Assam import all their labour from Bihar, Madras and C. P. while the fertile lands in the Brahmaputra valley have attracted settlers from Mymensingh and East Bengal. The tea-estate labour in Assam is now secured under fixed conditions and is well looked after.

The Bengali is as a rule averse to work in the mines. Hence most of the industrial work in Bengal is done by immigrants from Nepal, Bihar, Orissa and the East U. P.

Labour Immigrants in Bengal

Bihar and Orissa	... 80 p. c.
U. P.	... 18 "
Nepal	... 5 "
C. P.	... 3 "
Others	... 14 "

Bombay too gets most of its industrial labour from outside. The Punjab, U. P., and N. W. F. P. on one side, and Hyderabad and Madras on the other are the major contributors.

The stalwart Punjabi is ubiquitous and is found almost everywhere working as a technician, a taxi-driver or a policeman.

(b) Indians Abroad:—

Emigration plays an insignificant part in the movements of Indian population. She has ordinarily no more than about three million people resident in other parts of the British Empire and only about 100,000 in foreign countries like Dutch East Indies, Dutch Guiana, Madagascar, U. S. A., etc. Ceylon, Burma and Malaya have as many as two millions out of the three in the British Empire.

The following table gives the number of Indians in some parts of the empire.

Ceylon	...	7,00,000
Br. Malaya	...	6,00,000
Canada	...	1,20,000
Trinidad	...	1,50,000
Jamaica	...	18,000

Most of the emigrants from India are manual workers. The rest are either business men or artisans who have voluntarily gone out to improve their lot. In spite of the great increase in population in the last decade emigration has not served to relieve pressure. One reason why the Indian does not go out in large numbers is that he is not tolerated abroad. The recent Pegging Legislation in South Africa is a case in point. The standard of living in the Dominions is higher than that of the Indian immigrants, hence the restrictions on their entry and the segregation of those already settled. This is most unfair. There are many parts of the British Empire in the tropics like British Guiana and Africa where the density of population is low and which are peculiarly suited to Indians. Schemes of emigration from India to such places could be taken in hand with success and the pressure at home relieved.

B. A STUDY OF RACES, RELIGIONS AND LANGUAGES

1. The races of India. At a very early stage, the only people living in India were very wild and uncivilized people referred to as the pre-Dravidians. Then, they were replaced by a more advanced racial group known as the Dravidians. They were dark skinned people of short stature, with black hair and eyes, and broad noses. They spread all over India and drove the wild inhabitants away to the hills and the thick forests. This group is a branch of one of the really big racial groups of the world.

The earliest invaders, who entered the country from the north-west and settled there, were the Aryans. They were tall, light skinned people with fine straight noses. Being physically stronger,

they took possession of the best lands, such as the fertile plains of Northern India and drove the earlier inhabitants into the Peninsular India, South of the Satpura line.

Later on, through the northern and eastern river valleys came the Mongols—people with dark yellow skins and flat faces, and



Fig. 63

settled in the northern and eastern outskirts of the country. Then people of various other races, for example, Scythians, Iranians and Turks entered the country from time to time often inter-marrying with the people they had conquered. As a result of this mixture the following races have been traced by Sir Herbert Risley (1891).

1. Dravidians, in Madras, C.P., and Central India.
2. The Mongoloids in the Himalayas, Nepal and Assam
3. Mongolo-Dravidians, in Bengal and Orissa.
4. The Arya-Dravidians, in Southern and Eastern U.P., Bihar and Eastern part of Rajputana.
5. The Scytho-Dravidians, in Maharashtra and Malabar.
6. The Indo-Aryans, in the Punjab, Kashmir, U. P. and Rajputana.
7. The Turko-Iranians, in Baluchistan, and N. W. Frontier Provinces.
8. The Aborigines of Chota Nagpur Plateau.

less society. During recent years political differences have become so deep that both Hindus and Muslims have begun to believe that they are two different nations, as Mr Savarkar President of the Hindu Mahasabha admits: "India cannot be assumed today to be a unitarian and homogeneous nation, but on the contrary there are two nations, in the main, the Hindus and the Muslims."

The *Scheduled Castes* number about 40 millions or near about 14 p. c. of the total British Indian population. They are specially numerous in —

U. P.	20 p. c.
C. P. and Berar	18 p. c.
Madras	16 p. c.
Orissa	14 p. c.
Bengal	12 p. c.
Bihar	10 c. c.

These people are supposed to be of the lower order both socially and culturally and were meant by the caste-makers for the cleaning and other dirty work of the higher castes. Both Hindus and Moslems regard them as low. Mahatma Gandhi has taken the welcome step of bettering their lot. He calls them as 'Harijans' or the 'sons of God'. Now the puzzling question is whether they are a part of Hindus or they constitute a separate unit. In the Punjab some 400,000 persons declared themselves as 'adhbarmis' in 1931 and 1941 census. But the fact remains that they constitute an important minority in all the provinces. "The distribution of Scheduled Castes shows a widely scattered pattern" in the country.

The *Tribes* have a total of about 17 million or about 7 p.c. of the total population. Their largest concentrations are found in Assam (24 p.c.), Orissa (21 p.c.), Bihar (18 p.c.) and C. P. and Berar (18 p. c.). In Andamans and Nicobar they are about 40 p c. of the population. They constitute compact groups and live an entirely primitive life. Their abodes are usually in the hills and the forests of the country. Most of them are animists but some believe in Hinduism, Islam, Buddhism as well as in Christianity.

Sikhs are found mostly in the Punjab* where their number is about 3·76 millions or 90 p. c. of their total in the country. In the Punjab they constitute 13 p. c. of the total population. Socially Sikhs are a part of the great Hindu organisation as their mode of living, habits etc. are similar. There is also no bar for inter-marriages amongst Hindus and Sikhs. Sikhism as a religion, however, "seeks a synthesis of the monotheism of Islam and the philosophical thought of Hinduism."

Christianity claims about 8 million persons within its folds—more than 1 per cent. of the total population. They are very numerous in Madras† which province claims about 60 per cent. of

*Specially in the Ghazgar Plain—Ambala and Jullundur Divisions.

†Mainly in Coimbatore and Tanjore where they claim 10 per cent of the population their number is 1,000,957.

the total. Elsewhere they are very few in number and live mostly in urban areas.

Jains, Parsis and Buddhists constitute small groups. Jains are particularly concentrated in Rajputana, Parsis in Bombay and Buddhists in Nepal and Bhutan. But everywhere their number is too small to claim any recognition as a separate unit.

The following table gives communal populations in the various provinces and warrants careful study specially in the 'Communal India' of today.

Province	Hindus*	Scheduled castes	Muslims.	Other Principal minorities
1. United Provinces	34,094,511	11,717,158	8,418,308	289,422 (Tribes)
2. Punjab	6,301,737	1,592,320	10,217,742	3,757,401 (Sikhs)
3. N.-W.F.P.	197,631		2,810,865	62,411 (Sikhs)
4. Bihar	22,173,890	4,340,379	4,716,314	5,055,847 (Tribes)
5. Orissa	5,594,535	1,238,171	146,301	1,721,004 (Tribes)
6. Bengal	17,680,054	7,378,970	33,005,431	1,889,389 (Tribes)
7. Assam	3,535,932	676,291	3,442,479	2,431,996 (Tribes)
8. Madras	34,731,330	8,068,492	3,896,452	2,001,032 (Indian Christians)
9. Bombay	14,700,242	1,855,148	1,920,368	1,614,293 (Tribes)
10. Sind	1,038,292	191,634	3,208,325	31,011 (Sikhs)
11. C. P. & Berar	9,880,583	3,051,413	7,36,697	2,937,334 (Tribes)
12. Baluchistan	39,521	5,102	438,930	11,918 (Sikhs)
13. Delhi	444,532	122,693	304,971	16,157 (Sikhs)
14. Ajmer-Merwara	376,481		69,896	91,472 (Tribes)
15. Coorg	105,013	25,740	14,730	19,713 (Tribes)

3. Languages. *The Linguistic Survey of India* enumerated some 179 languages and 544 dialects in the country. But there are

*Excluding Scheduled Castes.

only 15 major or literary languages*. 11 belonging to the Aryan and 4 to the Dravidian group. The pre-historic Austro languages also survive in some remote areas. The linguistic complexity of India is based on the racial complexity. For instance in the north and north-west Indo-European languages are prevalent, while in the north-east languages belong to the Tibeto-Chinese family. The main languages of India are:

A. Aryan 1. High-Hindi.

2. Urdu or Persianised Hindi or Hindustani.
3. Bengali spoken in Bengal.
4. Oriya spoken in Orissa.
5. Marathi spoken in South Bombay and Eastern C. P.
6. Gujarati spoken in Gujrat Kathiawar and North Bombay.
7. Sindhi spoken in Sindh.
8. Kashmiri and Pahari spoken in Kashmir and Himalayan slopes.
9. Punjabi spoken in Punjab.
10. Nepali.
11. Assamese spoken in Assam.

B Dravidian. (South India specially Madras.)

12. Telugu.
13. Kannada.
14. Tamil.
15. Malayalam.



Fig. 65.

*Even this could be reduced to 12 if we take note of very close affinity among some of them.

Rajasthani a modified form of Hindi is prevalent in Rajputana. Tulu is spoken in North Travancore. Karen, Chins, Malay and Kachin are spoken by the hill tribes of the Himalayas.

It should be stressed that Hindustani or Hindi is spoken and understood by nearly all the people speaking the Aryan languages. It is even understood in most of the peninsula.

Pre-Dravidian or Anstric languages are (1) Munda or Kol group, (2) Khasi and (3) Nicobarese. All of these belong to the tribes and the total of people speaking them does not exceed five million in all.

English is also an important language used mostly by the educated classes all-over. The per centage of English-knowing persons is highest in Bombay and Madras.

This complex linguistic pattern of India brings forth the need for a common language or *Lingua Franca* for the entire country. The usual prescription is simple Hindustani in Roman script or it could be simple English. The question is yet to be decided. And after all the problem is not of any urgent importance as with simple English, and Bazar Hindustani, our all-India affairs are going on unhindered. Looking at the vast size and the huge population of the country, the linguistic problem as it is today, is not so very despairing and no remedy is needed forthwith.

Literacy in India. For census purposes literacy has been defined as "the ability to write a letter and read the answer to it." Although in recent years there has been a vast increase in literacy figures, the matters stand at a very low level when compared with other countries. In 1941, out of every 1000 persons 121 persons were literate as compared to 46 out of every thousand in 1881. The following table shows the number of literates per 1000 in some of the provinces and Indian states (1941).

Bengal	161	U. P.	84.
Bombay	195	Bihar and Orissa	95.
Madras	130	N. W. F. P.	79.
Assam	113	Cochin	354.
C. P.	114	Travancore	477.
Punjab	129	Baroda	229.

The decade 1931-41 shows a good increase in literacy per centage—6.9 in 1931 and 12.2 in 1941—and it is hoped that with the new plans in operation in the various parts of the country, the figures in the next census will show a very marked increase.

Parsis are the most literate community, then come Jews and Jains and Sikhs. The major communities *i.e.*, Hindus and Muslims are equally very low. The following table shows the literacy per 1000, aged five and over in different communities according to 1931 census.

Parsis	791
Jews	416
Jains	353
Christians	279
Sikhs	91
Hindus	84
Muslims	64

Literacy in women is as yet at a very low level in India. Only 23 women out of every 1000 are literate, a figure which is disgracefully low and yet this figure shows an increase of about 150 per cent over that of the previous census.

Literacy in English, likewise is also quite low, lower in women. In 1931 out of every 1,000 persons, only 123 were literate in English (males 212, women 27).

We should aim at complete liquidation of illiteracy at an early date. Russia did this in 19 years, why can't we?

NATURAL REGIONS

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NATURAL REGIONS

NATURAL REGIONS OF INDIA

In all about five or six attempts have been made to divide India into natural regions. Out of these only two i.e., by M. B. Pitbawala and Kazi Saeed-ud-din Ahmad, are by Indians. The census regions devised by the census department are not so very useful from the geographers' point of view. The universally accepted scheme is that evolved by Dudley Stamp in 1922-24 and used in his 'Asia' and in the 'Regional Geographies of India'. We have,



account of each region
(Methuen and Co.) for

divided into three regions i.e.,
sub
can plains.

vided according to climate and natural regions. This means

1. The natural regions of the *mountain wall*.
2. The natural regions of the *Hindustan Plains*.
3. The natural regions of the *Indian Plateau*.

We have, however, changed the order of these regions and give them according to their human importance thus :—

1. The regions of the *Hindustan Plains*.
2. The regions of the *Indian Peninsula*.
3. The regions of the *Mountain Wall*.

1. The *Hindustan Plains*.

It is further divided into the following regions.

(a) Lower Indus Valley. (b) The Punjab Plains. (c) Upper Ganges Plain. (d) Middle Ganges Plain. (e) Lower Ganges Plain. (f) Brahmaputra Valley.

(a) Lower Indus Valley. This region i.e., Sindh became a separate province after 1937. Rainfall here is scanty, below 4". It is called the *unhappy valley*, because the invaders who came to India were unhappy at finding it a dry region contrary to their expectations. On the other hand it is called the *gifts of the Indus*. Irrigation is done by canals and agriculture is strictly restricted to the areas near the river and the canals. The interior is dry because of two reasons, (1) dry soil that soaks water and (2) limited supply of river water. Indus delta, too, is dry, only here and there some pastures are to be seen. Due to the lack of rainfall only about 16% of the whole area is cultivated and 3/4th of this 16% is irrigated by canals. The chief crop is millet and occupies about 34% of the area cultivated. Rice has been introduced only recently and occupies 23% of the area, wheat occupies 12%, cotton 7%, oil seeds 6%. On the whole population is thin and is concentrated in the irrigated areas. Cities are few. Karachi, which is also the capital, is the only important port.

(b) The Punjab plains mainly consist of the valleys of the 5 rivers and the small province of Delhi. The doabs are characterised by their flatness and by the continuous deposits of alluvium. At places near about the rivers one comes across very young soils called *khadar*. It is on account of this characteristic of the soil that it is easy to dig canals. There are places near the Chenab and Jhelum which are high and where it is difficult for the canals to reach, with the result that this doab (Sagar Doab) has practically no irrigational facilities.

The areas lying near about the hills are subjected to earthquakes which are caused due to the land movements in the Himalayan mountains. To the south of the river Sutlej the land gradually begins to rise and gets drier and drier till it merges into the Thar desert. Taking on the whole the climate of these plains is Winter temperatures come down to about 55°F while the temperatures rise to 90°F and above. Frost is also common in winters.

The *langar* portions of the plains have good deposits of *kankar* which is used for the construction of roads.

Rainfall on the whole is low below 25" but gets very low in the S. W. portion where it is often below 5". Towards the north and east there is a gradual increase. The northern portions also get cyclonic rains during winters which are very helpful for winter crops. Climatically we could further divide the region into 3 divisions.

(1) N.-E. portion. This is the wettest portion and receives 20"—30". Sub-soil water level is high and wells are used for irrigation.

(2) S.-W. portion is the driest area (5"—10"). Agriculture is impossible without irrigation. Wherever irrigation facilities do not exist semi-desert conditions are found.

(3) S.-E. portion receives about 20" but the average is subjected to great annual variations and therefore irrigation is also needed as stand by.

About 57% of the total area is under cultivation and out of this about 60% or about 13 million acres are irrigated. The greatest share in irrigation is claimed by S.-W. portion and the lowest by N.-East. As stated before the Sagar Doab, because of its rising topography, is bereft of irrigation.

Wheat is the most important crop and occupies between $\frac{1}{3}$ and $\frac{1}{2}$ of the total cultivated area and contributes 35% of the total crop production. Millets contribute 12%, rice 3%, barley 4%, cotton 8%, and fodder 15%. The high percentage of fodder is due to the absence of natural food for cattle which are used in large numbers for cultivation and transport purposes. Cotton is important for its quality. This is the only province in India where American cotton is successfully cultivated.

Population on the whole is fairly dense and about 65% of the people are actually farmers while only 13% live in towns. The rest are also rural and follow cottage industries especially handloom weaving. This particular industry claims $\frac{1}{3}$ of industrial workers.

(c) Upper Ganges Plain begins roughly from the east of Delhi and goes on upto Allahabad. It includes a very important geographical area—Ganges Jamma Doab. It differs from the Punjab plains mainly in the amount of rainfall received which is between 30"—40". There is however a general decrease towards west and an increase towards east and north. Irrigation is very important especially for the winter crops and the sugar-cane cultivation. In the years of scarcity of rainfall irrigation comes to the help of the farmer. In average years about 36% of the total area cropped including the double cropped area, is irrigated. The doab claims most of the irrigational works and the district of Meerut is the most irrigated district in the whole of Ganges plain. About 57% of the agricultural land is irrigated.

Taking the region as a whole about 70% of the total area is under the plough. Double cropping with intervening cash crops is followed. Wheat and barley are leading winter crops. Rice is cultivated in the wetter districts. The area is very famous for sugar-cane cultivation and sugar industry. Millets and pulses predominate in less fertile and drier districts. Cotton is an important cash crop. The density of population is very thick. About 88% of the people live in localities having less than 5000 inhabitants. Cawnpur, Hathras and Agra are important industrial towns famous for their cotton mills. Leather goods are important in Cawnpur. Agra is important for its stone industry also.

(d) The Middle Ganges plain includes nearly the whole of Bihar lying north of Ganges, portions of Patna, Gaya, Shahabad districts lying immediately south of the river and a small portion of U.P. lying east of Allahabad and north of Ganges. This region is transitory between the wet lower Ganges Valley and comparatively drier upper Ganges Valley. Rainfall varies from 40" in the west to 70" in the east and north. Temperatures are less extreme than in the Punjab or Upper Ganges plain. In January the average lowest temperature never goes below 60°F. In June the average maximum temperature never goes above 85°. Irrigation is not a necessity and hence not so very important but some facilities exist for years of special scarcity. It is only in a very small strip to the south of the Ganges that river Son and other streams are used for irrigation regularly, as this area is comparatively drier.

The main work of the rivers here is of deposition because of the very slow speed with the result that the river beds are gradually rising up and the water level in the rivers is higher and very often the rivers overflow their banks and cause flood. Originally this area was associated with shallow lakes and marshes. They represented old deserted river beds or low lying areas between them but at present most of the marshes have been drained and now about 75% of the area is cultivated.

With the increase in rainfall rice gains importance and wheat and barley go down. Millets completely disappear and cotton also loses importance. Sugar cane and oil-seeds are other important crops. Formerly this region was important for indigo and opium but now both of the commodities have lost much of their importance. The area is very densely populated and the birthrate is high with consequent emigration to the tea gardens of Assam and to the factories and docks of Calcutta. Benaras, Patna, Munghyr, and Mirzapur are the important towns. Benaras is very important for its silk and brass industries and Mirzapur is important for its lac industry.

(e) The Lower Ganges plain corresponds roughly with the presidency of Bengal and consists entirely of an alluvial plain portions of which are being renewed yearly by the channels of the Ganges-Burhamaputra river system. In the north, portions of Tarai, locally known as

deltas are also included in this region. The Surma Valley of Assam is also included. The region taken as a whole is characterized by heavy rainfall which is every-where above 60". There is however a westward decrease—Sylhet 100", Dacca 73" and Calcutta 60". The region claims only a small percentage of agricultural land as nearly half of the area is covered with swamps, marshes and forests (Sunderbans and Madhopur). Only about 50% of the area could be claimed as available. But the net area cultivated is much lower. Rice is the most important crop and occupies 3/4th of the total area cultivated. Jute is another speciality of this region. Oil seeds are also quite important. The population is mostly rural and about 75% of the people are rural. The area could be further sub-divided into 3 sections: (1) The Ganges Barhamaputra doab; (2) The old delta or the west central Bengal. This region contains the important coal-fields of Raniganj, Jharia and Asansol in the extreme west; (3) the New Delta.

(f) The Assam or Barhamaputra valley occupies the middle course of the Barhamaputra river and is surrounded on all the sides by mountains. This is a small region 500 miles long and about 50 miles broad. Geologically and physically it is more or less similar to the alluvial plains of the Ganges. The areas lying immediately near the river banks are marshy and unsuitable for agricultural purposes. But places lying away have important rice fields. The gentle slopes of the hills are covered with tea gardens. Taking as a whole the rainfall is about 80". But the portions lying in the centre are somewhat dry. Winter fogs are common. The temperature conditions are a bit different from the delta region and taken as a whole the climate is somewhat colder. But cloudy skies tend to temper the heat of the summer season. The atmosphere during the summers is very sticky. Only about 10% of the area is cultivated but there is a large per centage awaiting development. The density of population is about 150 persons to a sq. mile. There is a tendency for the population to concentrate in the western areas adjoining Bengal. About 38% of the population is Assamese and the rest comprises of the Beharis and Nepalis working in the tea gardens and the Bengalis working in the paddy fields. The paddy fields could be extended into the plains if the drainage could be improved. At the eastern end of the valley there are two small oil fields of which Digboi is noted. Near the oil fields there is also a small coal field but it has not yet gained importance. The Barhamaputra river is much used for boat traffic.

2. The Indian Peninsula is broadly divided into (a) Coastal Region, (b) The Plateau, (c) Central India. The natural regions, therefore, are:—

(a) The Coastal Region:

1. Cutch, Kathiawar and Gujrat.
2. The West Coast Region.
3. The Carnatic or Tamil Region.
4. The Northern Circars region.

(b) The Plateau.

5. The Deccan Region.
6. The Deccan Lavas.
7. The North-east Plateau.

(c) Central India i.e., north of Satpura Line.

8. The Central India Foreland.
9. The Rajput upland Region.
10. The Thar or the Great Indian Desert.

1. Cutch, Kathiawar and Gujarat lie between the dry Indus valley (and the Thar desert) and the humid west coast region. It is a low level area with occasional hills of varying sizes.

Cutch is actually a part of the Thar desert that lies to the north and is almost dry and treeless, and hence useless for man. Kathiawar too suffers from a precarious rainfall. The Gil forests lie in the centre of the region and yield some timber. It is only here and there that one comes across some favoured spots otherwise the country is quite barren. Some cotton is cultivated in Dhan. Wheat grows with irrigation. A type of limestone known as *Porbandar stone* is found along the coast.

Gujarat is divided into northern, central and southern Gujarat according to the amount of rainfall received. Southern Gujarat is the wettest, while the rainfall decreases in the central and the northern parts of the country. Southern Gujarat has a strip of black cotton soil where cotton and rice are grown and the population is also quite large. Further inland there are forests and thick jungle. These wild areas have a number of primitive tribes. In central Gujarat rice is grown on the river banks, millets and cotton being more important elsewhere. The population in this part is denser. Northern Gujarat is as a whole a region of poor soils and dry climate. Millets are grown in regions of better soils. Tank irrigation is important.

The main line of B.B. & C.I. Rly. runs through Gujarat and touches Surat, Baroda and Ahmedabad all connected with cotton growing or cotton manufacturing areas. Ahmedabad with a population of 591,000 is a very important centre for cotton mills, second only to Bombay. Baroda is the capital of Baroda State and also has a number of cotton mills. Daman and Cambay are also important as cotton centres.

2. The West Coast region lies between the crest of the western ghats and the Arabian Sea and comprises of a narrow coastal plain and the western slopes of the western ghats. The Portuguese territory of Goa divides the region into two, the northern and the southern part lying respectively in Bombay and Madras Presidency. Except to north of Bombay rainfall is everywhere over 80". The dry season, however, becomes longer as one moves northwards away from the almost equatorial conditions of Travancore. Both the regions have many streams that flow down from the ghats and have even formed their alluvial fans, while sand-dunes have been piled up by the waves that beat against the shore during the South-West Monsoon.

The northern strip is narrow, about 30-40 miles wide. But in spite of its narrowness three parallel strips may be distinguished. 1. The slopes of the western ghats. 2. The flat alluvial lands. 3. The shores abounding in sand-dunes and lagoons. The slopes of the western ghats are in their outer surfaces, covered by Deccan lavas and on account of the high rainfall they are clothed with luxuriant forests in which teak is important; and consequently teak industry is of some significance. The short and swift streams besides being used for transporting timber, have also been harnessed for supplying power to the mills in Bombay. The southern portions of the ghats in this region are almost uninterrupted except for the two fairly important passes which have done much to determine the importance of Bombay.

The flat alluvial lands are the most important areas in this region. The shores are largely covered with marshy tracts of mangrove swamps. One also meets a good number of coconut palms. The region is densely populated, the minimum density being 200 persons.

The southern region is broader and is characterized by high annual rainfall and higher uniform temperatures, the annual range being very small. In the south there are some rubber plantations. The number and size of the lagoons here is much larger and most of these lagoons have been connected by canals and so it is possible to travel the entire region by these waterways. Cochin which is situated on a high lagoon has now been turned into a modern harbour.

About 46% of the western coast is under cultivation, 23% is covered with forests and 31% is either waste or not available. Rice occupies the first position amongst crops (50%). Coconuts are also important (6%).

3. **Carnatic or Tamil Region.** Geographically it is the southern portion of the east coast but as Tamil is the chief language spoken it is referred to as the Tamil region. The region may be readily divided into two topographical features: (1) the coastal plains that consist of a broad stretch of flat land, and (2) the hilly western part that consists of hills composed of crystalline rocks. In the matter of rainfall the region differs from the whole country as it receives its maximum during October-December. The average annual rainfall is 40" in the coastal plains and gets lower as we go towards the west. The region has a bigger annual range of temperature than the western coast (Madras 15°F). Local variations of rainfall are great and irrigation is a necessity for safe cultivation. In spite of the thousands of irrigation tanks it has been a great famine area. The modern canal irrigation works have done much to mitigate the famine menace. About 63½% of the land is under cultivation in the coastal region and about 45% in the western hilly tracts. In the coastal region rice is the most important crop and covers about 40% of the cropped area. Next in importance are millet and raggi covering together 57% of the area. The area is very densely populated—400 persons per square mile. In Tanjore density is 1694.

4. **The Northern Circars and Orissa region** comprise of the northern half of the east coast and includes the district of Vizaga-

patam, Godavari, Kistna, and Guntur and the province of Orissa as well as the district of Ganjam. The delta regions of the Godavari, Kistna and Cauvery are the best regions of the area; while as we go westwards we come across small hills and patches of crystalline rocks. A number of minerals are born from these crystalline rocks specially manganese near Vizagapatam; winning of salt is important in Orissa. The rainfall is not heavy here and it decreases from Orissa southwards.

In Orissa the rainfall is higher and rice is the main crop. As we go southwards millets get more important with the decrease in rainfall. In the deltas of Godavari and Kistna canal irrigation facilitates rice cultivation. The hill slopes are forested.

The density of population in the region as a whole is high. Railway transport is also quite developed and the area is directly connected with Calcutta and Madras.

Vizagapatam is the biggest town as well as the main port of Northern Circars. A modern harbour was finished here in 1933.

Cuttack and Puri are important towns of Orissa.

5. The Deccan comprises of the high southern portion of the plateau, comprising of Mysore state, the Deccan districts of Madras; the eastern half of Hyderabad and the Dharwar district of Bombay. The average elevation of land is more than 500 ft but in the south it is more than 2,000 ft. The valleys of Kistna and the Penner constitute the better plain regions of the area.

The entire area except for a small strip on the coast lies in the rain-shadow and rainfall is on an average quite low—at places even lower than 20"

The chief attraction of the region are the gold mines in Kolar (Mysore), producing about £1,500,000 worth of gold every year.

The coastal region in the west and the slopes of the Western Ghats are covered with forests. The soils as a whole are poor and millets and raggi form the chief crops. Some cotton and rice are also grown in better regions mostly with the help of irrigation. Coffee was formerly quite an important crop of the slopes of Mysore but it has dwindled in importance.

The population is not very dense, the average being about 200 souls per square mile.

Mysore and Hyderabad (733,000) and Bangalore are the chief towns. The first two are the capitals of the states of the same name. Bangalore has a number of silk factories.

6. The Deccan Lavas region, also referred to as the Deccan trap and the black soil region. Perhaps the most appropriate name is the latter on account of the particular type of soil found here. Roughly the area comprises of a large portion of land lying south of Satpura line and embracing the plateau portion of the Bombay Presidency, western half of C. P. and Berar and the western half of Hyderabad. It is a land of bare undulating plains from

which at places rise small flat top hills. The soils are naturally dark in colour. They are retentive of moisture and are suitable for crops that do not require much moisture. On account of the particular type of soil it is not possible to pursue irrigation. Although the rainfall is not heavy about 70% of the land is cultivated, 17% is covered by forests, and only 16% is waste or not available. Rice is of no importance and claims only $1\frac{1}{2}\%$ of the total cropped area. Millets occupy 47%, cotton 21% and wheat 6 $\frac{1}{2}\%$. Besides these oilseeds are also important. It is the most important cotton producing area of the country. Although a major portion of the cotton cultivated here is of native variety. The high plains of Berar are the favourite cotton lands and are well situated for supplying cotton to the mills in Bombay. Average density of population is low (160 persons)

Sholapur, Poona and Nagpur (302,000) are the chief towns of the region. Nagpur is the capital of Central Provinces and an important railway junction. Poona is the summer capital of the Bombay Presidency and commands one of the gaps leading to Bombay. Sholapur along with Amraoti commands attention as collecting centres of the cotton lands of Bombay and Berar.

7. The North-Eastern Plateau comprises of five sub-divisions in (1) the Central Indian Highlands, (2) Chota Nagpur Plateau, (3) Eastern Ghats, (4) Chattisgarh Plain (Mahanadi valley) and (5) the Godavari valley.

The rainfall in the region as a whole is high everywhere, more than 40" and hence greater than in other parts of the Deccan plateau.

In Chota Nagpur plateau, only about 40 p. c. of land is cultivated, while about 60 p. c. is under forests or wild. A number of primitive tribes live in the hills and forests of this region. Santals are the most numerous. The Central Plateau is similar to No. 1 on a small scale. Jabalpur in the Narmada valley is an important city and important railway junction.

The Eastern Ghats here present very primitive and mild conditions. The population is less than 40 persons per square mile. There are no railways here.

The Chattisgarh Plain, lying between the three areas of highlands just described, is a valley Plain (Upper Mahanadi Valley) now cleared for cultivation of rice. A railway line connects Raipur with the port of Vizagapatam.

The valley of Godavari comprises of the eastern parts of the Wardha valley and the Wain-Ganga Valley-plain. Although it is a continuation of the cotton fields of Berar, the soil here is not of the type of the black-cotton soil. The amount of rainfall received here is also larger and hence rice is the main crop. Some cotton is also grown. Nagpur, the capital of C.P., lies within this region. It is important for its cotton mills.

(8) The Central Indian Foreland is a plateau extending between the Ganges Plain and the valleys of Son and Narmada with an upward

rise. The region lies entirely in the Ganges Basin. The rainfall here is usually more than 40 inches and rice gains in importance. The town of Jubbulpur, already described, lies on its southern borders. It has a few cotton mills.

(9) The Rajput* Upland Region is a drier region. Here millets and cotton are important crops. Five distinct units may be recognised here: (1) The Aravalli range and its north-eastern extensions. (2) The forested hills of Rajputana. (3) The valleys of Eastern Rajputana; (4) The Malwa plateau built up of Deccan (and the Vindhya range). (5) The Narbada Valley.

Bhils are the most important tribe, living in the hilly forests of the region. Ajmer, Jaipur and Udaipur are important towns known mostly for their historic buildings.

(10) The Thar or Great Indian Desert occupies the greater part of Rajputana and small portions of southern Punjab and eastern Sind. The annual rainfall is even lower than 10 inches. On account of the absence of surface streams and due to desert conditions, irrigation is not possible. The Ganga Canal in Bikaner is a fine example of ambition to serve his people on the part of the Maharaja of Bikaner.

The population is very thin.

*The Northern Mountains.

These may be divided into the following regions. This division is based on rainfall distribution.

1 The Eastern (or the North-Eastern) Hills include the eastern hills that separate India from Burma and the Assam hills—the chief being Pakol, Naga, Manipur (Plateau) Lushai, Chittagong and Chin hills.

Taken as a whole the rainfall in this region is heavy as it lies directly on the route of the Bay of Bengal branch of the S. W. Monsoon. A good area is covered by forests (15 p.c.). Only about 4 per cent is suitable for cultivation. A number of tea gardens are situated on the slopes of Assam hills. Fruit trees do well in the Garo hills.

Owing to rough topography and the parallel arrangement of unbroken ridges, communications and population are in a very unhealthy state. In the forests and hills live a number of tribes who have destroyed vast areas of forests by burning off to obtain small tracts of land for cultivation.

2. The Himalayan Region comprises of the Himalayan Mountain chain approximately from 5,000 feet upwards. Here the unhealthy, forested slopes are left behind and an invigorating healthy atmosphere pervades the environment. The Ganges divides this region into 2 subdivisions (1) the eastern and (2) the western. The latter is characterised by lower rainfall, while the western enjoys a heavy rainfall. The eastern region rises abruptly from the plains and very soon the Himalayan heights are reached while the western is characterised by a gradual rise. With this region the layman usually associates the hill-stations of India.

* Lying mostly in Rajputana.

The eastern Himalayan region has a very low average density of population. Darjeeling, the summer capital of Bengal, is the largest town in this region. Other towns are Katmandu (in Nepal) and Kalimpong.

The western half of the Himalayas includes Kashmir and the adjoining ranges, namely Karakorum, Ladakh, Zaskar, and the Himalayas proper (Lesser and Greater). All the five rivers of the Punjab except the Sutlej, rise within this region (Great Himalayas) and flow through cutting across the Lesser Himalayas. The Sutlej rises in Tibet and cuts right through this region.

The rainfall in this region much lower and shows a gradual westward decrease. Agriculture is limited to rougher and coarser grain, is carried on in the valleys. Population is on the whole very low.

Kashmir and the Kashmiris are the most important items in the region. Srinagar on the Dal Lake is the most important town.

3. The Sub-Himalayan Region consists of the foothills between the plains and the mountains as well as the lower slopes of the Himalayas up to 5,000 feet. Like the Himalayan region, it also can be divided into (1) Eastern (wetter) and (2) western (drier) regions. Originally the whole of this region was covered by sub-tropical forests.

The eastern half could be divided into (1) The Tarai (or Duars) consisting of swampy, unhealthy lands lying at the foot of the mountains; and (2) the low hills situated upwards along with the slopes of the outer Himalayas. The natural vegetation of the foothills is monsoon forests of the valuable *sal*. Tea gardens are well established in northern Bengal. The U. P. portion of the Tarai is now cultivated. Taken as a whole the density of population in the region is scanty though in better cultivated places in U. P. and Bengal, it reaches quite high a figure.

The Western Sub-Himalayan Region is much drier than the eastern half already described. The Tarai is absent. However, the region could also be subdivided into the lower and the upper half. The upper half is covered by forests of the Chir pine. The lower half is covered by Dhak forests. The tree and its yield can be used in many ways. Wheat, maize and gram are grown in places which have been cleared. The number of such places is ever on the increase. There is a line of important irrigation works within this region. The density of population is quite high, as high as 300 or more in some places.

4. The Tibetan Plateau falls partly (only a small portion) within the state of Kashmir. But as politically Tibet falls outside India, it has not here.

5. Dry Hills Region roughly includes the of Jhelum, Rawalpindi and . . . About 35 p. c. of the area by forests owing to low following sub-regions :

The area lying east of the Indus in the Punjab (Cis-Indus Tract) is a dry sandy plateau. There is very little rainfall and practically no facilities for artificial irrigation. Millets and other dry crops are cultivated. There is an oilfield at Khanr.

The Indus Valley is an area more favourably placed and with brighter potentialities. The floods from the river are the main characteristics of the region and they control the harvests in the region.

The area lying between the Indus and the Frontier hills comprises of the Peshawar, Bannu and Dera Ismail Khan Plains (Trans-Indus Tract). The vale of Peshawar is well irrigated and has corn-fields and fruit orchards. The Bannu Plain is quite fertile and well irrigated specially around Bannu proper. The plain of Dera Ismail Khan is a dry desert. At places of heavier rainfall, some cultivation and grazing is carried on. The population is quite heavy in favourable spots.

The Frontier Hills lie to the west of the plains described above. These hills are arid, barren and treeless. It is on the valleys that some cultivation is carried on—Khurram valley being the most important. Large number of sheep are reared on the grassy hill-sides. The inhabitants are mostly of the Pathan species (Waziries, Afridis and Orakzais).

The percentage share of individual crops in the North West hills is:

Wheat	...	...	44 p. c.
Millet	...	...	18 "
Barley	...	...	7 "
Maize	...	...	7 "
Other foods	...	...	12 "
Oilseeds, cotton, and fodder	...	...	12 "

Wheat is grown mostly in irrigated lands while millets is grown on lands dependent on rainfall.

Both railway and road transport are quite developed in this region except in the isolated hills. A railway line runs right up to the Afghan Frontier through the Khyber Pass.

Peshawar and Rawalpindi are both important for their strategic positions on important trade routes. Peshawar is also the seat of the Frontier Government. Kohat, Bannu and Dera Ismail Khan are other important centres.

6. The Plateau of Baluchistan. Lying outside the mountain wall of the country—joined with India by Bolan Pass Baluchistan is out of the monsoonic influences and hence it is very dry (rainfall 10" or less). Politically it includes a few British districts and the native states of Kalat and Las Bela. Its area is about 135,000 square miles but its population is not dense, the density being about 6 per square mile. Pathans and Baluch are the chief people here. The average height of the plateau is between 1,000 to 3,000 feet above

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4. The Tibetan Plateau falls partly (only a small portion) within the state of Kashmir. But as politically Tibet falls outside India, it has not been described here.

5. The North-West Dry Hills Region roughly includes the Frontier Province, the Punjab districts of Jhelum, Rawalpindi and Attock and some hilly area in the north. About 35 p. c. of the area is sown and only about 8 p. c. is covered by forests owing to low rainfall. The region may be studied under the following sub-regions:

The area lying east of the Indus in the Punjab (*Cis-Indus Tract*) is a dry sandy plateau. There is very little rainfall and practically no facilities for artificial irrigation. Millets and other dry crops are cultivated. There is an oilfield at Khaur.

The Indus Valley is an area more favourably placed and with brighter potentialities. The floods from the river are the main characteristics of the region and they control the harvests in the region.

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REGIONAL CONTROVERSIES

1. **Climatic Regions :—** In the chapter on climate, we mentioned that the 13 rainfall divisions of India as given by Williamson and Clarke, should serve the purpose of a division of the country into climatic divisions quite well ; and that is why we gave a detailed summary of these divisions in the text. Kendrew's scheme as given in his ' *The Climates of the Continents* ' is perhaps the only appropriate scheme. According to him the basis is the rainfall distribution. Dudley Stamp in his ' *Asia* ' follows the same scheme with only slight modifications ; the chief deviation being the separation of 'Tropical' from 'Continental' India. The dividing line runs roughly along the Tropic of Cancer and takes a north-eastern turn in the east to include portions of Bihar, Orissa and Bengal. The line divides the North-eastern Plateau and the Middle Ganges Valley (Kendrew) into two regions, the northern one has been named the 'Transitional Region' by Stamp.

The scheme is as follows :—

1. **The Himalayan Region :—** Examples Simla and Darjeeling. (Though it has nowhere been mentioned, it seems obvious that this region should be divided into the eastern and the western halves, the former being much wetter. The sub-Himalayan region also stands distinct from the plains and the mountains and thus it may also form a separate division, to be further subdivided into the wetter eastern and the drier western halves, as has been done in the case of natural regions).

2. **The arid North-West Plateau—including Baluchistan and North-West hills.** Example Quetta. (In Baluchistan the conditions are markedly continental).

3. **The very wet (above 80") West Coast sub-divided into** (a) the Northern half (or Konkan) having rainfall during five monsoon months, (b) the Southern half (or Malabar) having rainfall for about ten months. The amount of rainfall is also much heavier in the Southern half of the western coast. Bombay is an example of the Northern and Trivandrum of the southern region.

4. **Bengal and Assam.** Chittagong is the example.

5. **The North-East Plateau and Middle Ganges Valley—Example, Nagpur.** (This has been further divided by Stamp into (1) North-East Plateau and (2) Middle Ganges Valley (Transitional region).

6. **Carnatic or Tamil region; example, Madras** (Winter rains).

7. **Southern and North Western Deccan—Example, Hyderabad Deccan.**

8. **Upper Ganges Plain—Example; Delhi.**

9. **Northern Punjab Plains—Example, Lahore** (Winter Cyclonic rainfall).

10. **Arid North-West Lowland—Example, Karachi.**

2. **Natural Regions.** The division of the country into natural regions has been carried out by a few British geographers. M. B. Pithawala, S. P. Chatterji and Qazi Sard-ud-Din Ahmad have also made similar attempts but their divisions are as yet under discussion and not finally accepted by geographers. Dudley Stamp's scheme has received universal approval and as such we have also stuck to it in this volume. But we feel that a student of geography should also be acquainted with other ideas on the subject so that he may get some material for thought.

McFarlane was perhaps the first geographer who for the first time, divided India into natural regions. As will be seen later on all the people have first divided India into 3 or 4 broad physical divisions and then subdivided them. Only their subdivisions vary from one another. Although McFarlane's divisions are rather broad, he deserves all credit for his pioneer work. McFarlane's scheme of Natural Regions of India as given in his 'Economic Geography' (Pitman) is :—

A. Extra-Peninsular :—

1. North-west Mountain Borderland.
2. Himalayan Region.
3. North-east Hill Tracts.
4. Lower Ganges—Brahmaputra Plain.
5. Middle Ganges Plain.
6. Upper Ganges Plain.
7. Punjab Plains.
8. Sind Plains.
9. Thar Desert.

B. Peninsular :—

10. East Coastal Area.
11. West Coastal Area.
12. South Archean Deccan.
13. North east Archean Deccan.
14. Rajput Uplands.
15. Gujarat Lowlands.
16. Deccan Trap areas including Kathiawar.

In 1922-24 Stamp drew up a fresh scheme of natural regions for use in his various text-books entitled the *Regional Geographies of India*, etc., etc. Later Prof. J. N. L. Baker constituted W. Arden Wood's unpublished ideas into a definite scheme which was as follows :—Geography, Volume XIV (Summer, 1928) pp. 447-455.

1. The Himalayan Regions.
 - (a) Eastern.
 - (b) Western.
2. The Sub-Himalayan Region.
3. N. E. Hill Tracts.
4. North-West Frontier Region.
 - The N. W. Dry Area.
 - The Assam Valley.

7. The Delta Lowlands.
8. The Indo-Gangetic Plains (East)
9. The Indo-Gangetic Plains (West)
10. Aravalli-Vindhya Uplands
11. Kathiawar and Gujarat (Transition between Sind and West Coast).
12. East Coast.
 - (a) North (b) South.
13. Berar-Orissa Highlands.
14. Chattisgarh Plain.
15. Central Highlands.
 - (a) West
 - (b) East.
16. Higher Plains of Berar and Nagpur.
17. Deccan Region.
 - (c) Bombay-Deccan.
 - (d) Deccan Southern.
18. West Coast.
 - (a) North.
 - (b) South.

It was a strange coincidence that both Stamp's and Baker's schemes were practically the same, although "there is considerable overlapping and uncertainty of homogeneity" in both. In the absence of a better scheme, Stamp's scheme has been universally accepted as it is more "rational and welcome." It may, however, interest some geographers to learn what a young Indian geographer, I. D. Malhotra has got to say about some of Stamp's regions. (*The Natural Regions of India, Punjab Geographical Review—Vol. I—1942*).

Dudley Stamp has divided the coastal region, west of the Indian plateau into two natural regions (a) the Gujarat region and (b) the West Coast region. The entire west coast region has certainly the same physical features, but in geological structure, the northern part of west coast differs from the south-western coast. In the northern part, the rocks eventually consist of the Deccan lavas. Besides, the northern part of the western coast also differs in climate, for in the northern part the rainfall entirely occurs in the monsoon season and thus there is no rainfall for seven months in the south west. rainfall is also received during the months of the south-west monsoon; rainfall is also received during the months of November and December. However, considerable rainfall is also received here in the months of April and May. During these months the winds are on-shore and the rainfall is over 10 inches along the south-western coast. Thus here there are only three months when there is no rainfall. On account of these differences in climate, Kewendrew in *The Climate of the Continent* has also divided the western coastal region into two climatic regions. As a result of these differences in climate the agricultural products of the south-western coastal region are also different. Thus in Travancore pepper shrub is cultivated and rubber trees are also planted. On account of these differences in the geological structure and climate, the western coastal region should be divided into two natural regions (a) the Karachi coast and (b) Malabar coast.

The Punjab plains also present a somewhat similar case, for in the western Punjab the rainfall is everywhere less than 20 inches and a considerable area has a rainfall of even less than 10 inches. Again Kewendrew also considers the western Punjab as a separate climatic region from the eastern Punjab. Here the natural vegetation consists of thorny bushes, and cultivation of crops is not possible at all without irrigation.

On the other hand, in the eastern Punjab the rainfall is over 20 inches and, therefore, the natural vegetation consists of scrub forests and cultivation of dry crops is possible in certain areas without irrigation. Thus the eastern part of the Punjab resembles the western and the southern parts of the United Provinces and it should be considered a part of this natural region, where the western Punjab should form a separate natural region.

Again in Stamp's book, the central India plateau has been considered as a separate natural region. Like the north eastern plateau the central India plateau is made up of archæan rocks. It also receives rainfall between 40 and 80 inches and hence it also resembles the north eastern plateau in natural vegetation. It is, therefore, not quite clear why central India plateau should be considered as a separate natural region. The presence of the Mahadeo hills & Maikal range does not appear to be a sufficient reason for the formation of this region into a separate natural region. The central India plateau should therefore be considered as a part of the north-eastern plateau. However, it may be considered as a separate sub-region just as Eastern Ghats and Godavari Valley have been considered as separate sub-regions.

Only two schemes have been published in India*. One by Dr. M. B. Pithawala was presented by him to the Lahore session of the Indian Science Congress in January, 1939 and the other was evolved by Dr. Kazi Saeed ud-din (Indian Geographical Journal—July-September, 1944)

1. Pithawala's Scheme. Inspired by the very interesting lecture† by Professor Ogilvie of Edinburgh, entitled "The Technique of Regional Geography with especial reference to India," he brought out a scheme of *Physiographic Divisions* of India as he is very much against a division into *natural regions*. "A geographical survey of any region," he says, "must necessarily take full account of its physiography, and therefore the divisions, made of India on a basis other than physiographic, must be highly defective and narrow in outlook. He bases his division on 'Geology and topography (rocks, drainage etc) as controlled by the internal and external agencies working on them'. While making sub-divisions, he says, there is no harm in taking help from other sciences as Botany, Zoology, Meteorology etc. His scheme is :—

A. Three chief divisions :—

1. Extra-Peninsular Mountains.
2. The Indo-Gangetic Plain.
3. The Peninsular Area.

B. Sub-divisions of the above.

1. Extra-Peninsular Mountains.

(a) Western lands.

1. Kirthar Mts. 2. Kachistan Section.

(b) Greater Himalayans :—

1. Northern Himalayan Section 2. Southern Himalayan Section.

* Dr. S. P. Chatterjee is reported to have evolved a scheme based on Forest Flora, surface relief and climate. But it has, to the best of our knowledge, not been published anywhere.

† At the Calcutta session of the Science Congress in Jan. 1938.

(c) *Middle Himalayas.*

1. North-West Dry lands. 2. Kashmir Valley.
3. Himalaya proper.

(d) *Sub-Himalayan Region.*

1. Frontier Section. 2. Siwalik section.

(e). *Eastern Highlands.*

1. Assam-Burmese Yomas. 2. Irrawadi Basin. 3. Shan Plateau.
2. *Indo-Gangetic Plain.*

(a) *Lower Indus Valley.*

1. Western Valley Section. 2. Eastern Valley Section.
3. Indus Deltaic area.

(b) *Upper Indus Valley.*

1. Potmar Section. 2. Punjab Plain.

(c) *Desert Province.*

1. The Pat Section. 2. The Thar Section.

(d) *Upper Ganges Valley.*

1. The Doab Section. 2. Rohilkhand Section.

(e) *Middle Ganges Valley.*(f) *Lower Ganges Valley.*

1. The Brahmaputra Valley. 2. The Ganges-Brahmaputra Plain. 2. The Ganges Deltaic Area.

3. *The Peninsular.*(a). *Rajput Uplands.*

1. North-Western Section. 2. Mewar plain. 3. South-Eastern Section.

(b) *Deccan Trap Region.*

1. Central India Tableland. 2. Western Ghats. 3. Bombay Deccan.

(c) *North-Western Tableland.*

1. The Mahanadi Basin. 2. The Godavari Basin. 3. The Eastern Ghats.

(d) *Southern Plateau.*

1. Cuddapah Section. 2. Bellary District Section.
3. Nilgiri Hills. 4. Tamil Section.

(e) *West Coast Province.*

1. Northern Section. 2. Southern Coast Land.

(f) *East Coast Province.*

1. Northern Coastland. 2. Carnatic Section.

Later Professor M. B. Pithawala made some alterations in the scheme in view of the all-round criticism. The following alterations have been made (The Madras Geographical October-December, 1939 issue).

PROVINCIAL STUDIES

India is for political and administrative purposes, divided into British provinces and a number of Indian States. There are also a number of foreign possessions of very small sizes (see figure 5)

British India is divided into eleven governors' Provinces and five Chief Commissioners' Provinces. Its total area is 910,407 sq. miles and total population is 295, 8'8, 722 souls. The governors' provinces are Assam, Bengal, Bihar, Bombay, Central Provinces and Berar, Madras, North Western Frontier Province, Orissa, Sindh and United Provinces. The Chief Commissioners' Provinces are Ajmer-Merwara, Coorg, Baluchistan, Delhi, Pauth Piplodba and the Andaman-Nikobar Islands.

The Indian states number about 584 and have a total area of 712, 508 sq. miles and a total population of about 93,189, 233 souls. The states enjoy complete internal sovereignty but they owe treaty obligations to the crown. The size of Indian states ranges from Hyderabad equal in area to Italy and the state of Bilbain having a total population of 27 persons.

The foreign (French and Portuguese) possessions occupy 1740 sq. miles.

French India ; The French possessions in India, a relic of the French expeditions to India from 1603 onwards, cover 200 square miles and have a population of about 520,000. Pondicherry, the headquarters of a French Governor, is the chief settlement. It is on the Coromandel coast about 100 miles south of Madras. The other possessions are Chandernagore in Lower Bengal, Mahe on the Malabar coast, Karikal also on the Coromandel coast, and Yanam, a few miles south of Cocanada. The French establishments rallied to the Free French movement after the defeat of France in June 1940.

Portuguese India : Portuguese possessions in India cover an area of 1,600 square miles and have a population of about 600,000. They date from the Portuguese invasion in the early sixteenth century. They are situated within the limits of Bombay province and consist of the province of Goa on the Arabian Sea coast ; the territory of Daman with the small territory called Pragan-Nagar Avelly on the Gujarat coast, at the entrance to the Gulf of Cambay ; and the little island of Din with two places called Gogola and Simbor, on the southern extremity of the Kathiawar peninsula. All these three territories, ruled by a Governor-General, constitute what is called by the Portuguese the State of India.

It is not necessary at this stage to give a very detailed account of the provinces and the Indian States as it will mean a lot of repetition and overlapping. Only brief accounts of some of the political units are given in the following pages.

ASSAM

Assam is situated in the North-East of the country and has an area of 67,334 square miles excluding the Tibet area. It is roughly as large as England and Wales. It has been a separate province since 1912, being a part of Bengal before that. It may be interesting to learn the considerations underlying this separation.

1. The people of this province have no racial affinity with the Bengalese.

2. There is also no linguistic affinity.

3. Assam is economically self-sufficient, having both agricultural and mineral potentialities.

4. Bengal was very unwieldy in size from administrative consideration.

Physiographically Assam may be divided into the following divisions:—(1) Slopes of the Northern mountains (2) The Brahmaputra or Assam Valley in the North (Goalpara, Kamrup, Nowgong, Darang, Sibsagar, Lakhimpur, Balipara and Sadiya). (3) The hills and ranges separating Assam from Burma. (4) The Assam Plateau extending from the Eastern hill ranges and comprising of the Khasi, Jaintia, and Garo hills. (5) The Surma Valley in the south and continued into Bengal (Sylhet district and portions of Cochar).

The province of Assam receives the heaviest rainfall in India—annual average being 80". It is only in the Brahmaputra Valley, that the rainfall is less, because the rainbearing winds are obstructed by the Garo and Khasi hills. The Valley remains mostly swampy and malaria is rampant. Assam is a land of immense and vast forests most of which still lie unexplored although they are rich in economic potentialities in the shape of minerals and timber. Assam has oil and coal. There are 8,377 people employed in the oilfields and 6,376 in coal mines. Tea on the slopes and rice and jute in the valleys and plains are the main crops. Railways are not well developed in Assam owing to obvious physical and climatic considerations. The Brahmaputra is largely used for transport purposes. A railway line joins the upper part of Assam valley with the plains and the delta region in Bengal and goes as far south as Chittagong. A branch line goes on to Sylhet. A war-time road goes on from Manipur and Dimaapur to Burma across the hills. The total population of Assam in 1941 was 10,235,000 persons. Agriculture employs about 89 per cent of the people and industry about 9 per cent. Tea industry is the most important industry of the province. There are about 1,125 tea gardens and about 638 tea estates in Assam.

Natural Regions:—The five divisions mentioned above also form the natural regions of the province. They are now discussed individually.

1. The Lower Himalayan Slopes roughly lie along the northern boundary of Assam. At places they cross into the Assam valley for several miles. Owing to heavy rainfall, these slopes are densely forested. Large areas have been cleared for tea cultivation. Jute and rice are grown in the valleys lying between hill ranges and on the terraced slopes. The people belong mostly to the Tibetan race and live in small villages.

2. The Brahmaputra or the Assam Valley is an area of about 27,692 square miles and a population of about 5,695,669. It is an alluvial plain measuring about 450 miles from north-east to south-west with an average width of about 50 miles. It is surrounded by hills on all sides except in the west. The Valley gets rainfall for about eight months in a year, the average being 95 to 100 inches. The soil in this region is a mixture of clay and sand. Evergreen forests are largely found in this region, but wherever they have been cleared rice and jute are cultivated. The submontane tract is mostly dependent for its agriculture on artificial irrigation. About 21% of the total area is cultivated (48% waste, 16% forests). About 65% is under rice, 8% under tea and 5% under jute. Oilseeds occupy 9%. There are some good deposits of coal and petroleum, the latter at Digboi and the former in Shibsagar and Lakhimpur. The output of coal in 1933 was 238,102 tons.

The density of population in 1941 was 206 persons per square mile as compared to 171 in 1931. The Valley attracts a huge number of immigrants from Bihar, Bengal and United Provinces for work in the tea gardens.

There are only two railway lines in this valley (1) The Eastern Bengal Railway goes as far as the bank of the river Brahmaputra just opposite Gauhati. (2) The Assam-Bengal railway goes from Gauhati to Sadiya. Another branch of the railway crosses the plateau of Assam into Bengal.

There are a few roads running through the valley. There are cart roads from Gauhati to Shillong and from Dibrugarh to Manipur state. River Brahmaputra is used for transport by means of boats for the greater part of its length.

3. The Eastern Hills. The direction of these hills as they sweep from the far corner of Assam is from N. E. to S. W. in the beginning but later on after half of their own length they suddenly take a curve and turn southwards and continue till they come to Cape Nagrais where they disappear near the coast. This hilly region is narrow in the beginning, broad in the middle and narrow again in the latter part. In the north the hills are called the Parkoi hills, next come the Naga hills, then further we come to the Manipur plateau, then come the Lushai hills which to the further south change into Chin hills which again followed by Arakan hills. The Chin hills and the Chittagong hills are not in Assam.

These hills are not very high. Generally they are 6000 or 7000 feet high. The highest peak is Mount Victoria (in Burma) which is 10,000 feet high.

The hills enclose long narrow valleys. The lower slopes of the hills are covered with evergreen forests and bamboo and cane trees. Patches of pine forest are found between 4000 and 4500 feet. Further up broad-leaved trees are found and further on grass covered mountain peaks are seen. Snow does not occur on the hills because they are not very high.

From the Naga hills a branch runs from east to west. These hills form the plateau of Assam. They are called Khasi, Garo and Jaintia hills.

The high ranges in the Eastern hills region are called "The Eastern Wall" as they serve the purpose of a wall between India and Burma. The hill and mountain ranges are very steep. They enclose valleys which are quite separated from each other. It is very difficult to move from one valley to the other or from one hill to another. There are four gaps in the Wall (1) Tuza gap, (2) Manipur gap, (3) Taungup gap, (4) An gap. The former two are in Assam.

Everywhere, on the slopes of these mountains we find thick wet forests and a thick tangle of canes and bamboo. The trees are evergreen. On the lower slopes of the mountains the chief tree is the oak which has got broad leaves. As we go higher we come across coniferous forests. Here and there between 4000 and 4500 feet of height we come across patches of pine forests. On the tops of the mountains we find green grass. Here and there we find mountain flowers growing in the grass. Terraces are made here and there. Maize and rice are cultivated in these steps. Manipur has got an outstanding importance among those parts which export rice. Manipur is a plateau surrounded by hills. Even then the rainfall is over 60". We do not find many people as we travel through the region. As we travel towards the north we find that villages are situated on the spurs of the mountains. These villages are surrounded by patches of cultivated land. The people are not very civilized. They like to adhere to their old customs. They very seldom come down to the plains. Several languages are spoken in these hills. Nearly every well-known valley has its own language.

4. The Assam Plateau. The plateau consists of three well known ranges viz., Garo, Khasi and Jainti. The hills run from east to west. They face southwards. The slope to the north is very gradual. The monsoon winds rise from the Bay of Bengal and meet these mountains. Much of the rain falls on the southern slopes of these hills. Cherrapunji gets 500" of rainfall annually. The hills keep on rising above Cherrapunji and then the plateau slopes to the north. On this plateau is situated the town of Shillong which, although sheltered by the southern mountains gets 83" of rainfall. The plateau although situated in the rain-shadow, is sufficiently wet.

The temperature in the plateau is quite low. The summers are cloudy and hence the daily range of temperature is not large.

The lower slopes of the hills are covered with evergreen forests* the chief trees being the sal and the oak. These trees thrive upto a height of 3,000 feet. Above this line conifers take the place of evergreen trees. Higher up, the slopes and the peaks are covered with grass. Most of the forests are not available for use. A very small area in the plateau is cultivated. The gardens and the rice fields occupy most of the cultivated area. Maize is also grown on the terraced slopes. Rough cotton is also cultivated in drier areas specially in those situated in the rain-shadow. Some limestone is quarried in Khasi hills.

The population is not very dense in the plateau, the average density being about 50 persons per square mile. Ninety per cent of the people are agriculturists. Many people come from Bihar, Bengal and Madras to work in the tea gardens. The hills contain many tribes like the Nagas, Chins and Jaintias.

Shillong*, the chief town of the region, is the capital of Assam. It is situated on the Khasi hills. Shillong is a modern town situated amidst an environment which is totally primitive. It is more easily reached from the north side from the railway running along the Brahmaputra valley. There are two approaches to Shillong from Calcutta, one via Gauhati and the other via Sylhet. A distance of about 80 miles is covered by motor to Shillong as there is no railway up to the town itself.

The town of Shillong occupies an area of about 6 sq. miles at an height of about 5,000 feet above the sea-level. But the town itself is situated on level ground.

5. The Sorma Valley situated partly in Assam and partly in Bengal† has an area of about 7,450 sq. miles and a population of about 3,757,781. In Assam it includes the district of Sylhet and the lowlands of Cachar district and is by far the most fertile and the mostly thickly populated part of Assam; average density being 400.

The valley is a flat plain, about 115 miles long and 60 miles broad shut up on three sides by hills. It is an alluvial tract. Owing to the rivers being sluggish the fields are annually enriched with silt. Northwards the valley merges into mountains.

Like the Brahmaputra valley, the valley also receives heavy rainfall, the annual average being 128 inches. Cherrapunji in this region receives perhaps the heaviest rainfall in the world about 600 inches.

* A very good account is given in *Geography of Shillong* by Miss Sudhira Ray, Calcutta *Geographical Review* September 1934.

† The valley is linguistically and socially a part of Bengal and its inhabitants a few points of contact with the dwellers in the Assam Valley.

Large areas of this region are forested. The ever-rising banks of the rivers are very fertile areas dotted with villages. About 86 per cent of the total area is actually cultivated although about 70 per cent is cultivable. The northern part of Cachar abounds in bamboo forests. Grass and long reeds also occupy some area.

Rice is the chief crop of the region. *Aus* and *Aman* paddy are cultivated and the fields are high. Tea is also cultivated. The following table gives percentages under individual crops.

Rice—80.6	p. c. of cultivated area.	
Tea—6.3	"	"
Oilseeds—1.6	"	"
Jute—0.9	"	"
Others—10.0	"	"

The chief peculiarity about the Surma valley is that it contains numerous tea gardens. In Sylhet and Cochar about one third of the people are engaged in tea production.

BALUCHISTAN

NOTE :—(An account of Baluchistan Plateau has been given in the section entitled Natural Regions. This may be supplemented by what given is below).

Baluchistan has a total area of 134,638 square miles. Politically it consists of British Baluchistan, tribal areas and states namely Kalat, Kharen and Bela. The province runs with a frontier of 723 miles with Afghanistan, 520 miles with Iran (Persia) and 471 miles of coast line. It encompasses several miles of the London Karachi air road. Its importance is more strategic as "India's sentinel on the most gigantic historical gate way of India."

Baluchistan is a dry Plateau with a rugged surface having an average height of 1,000 to 3,000 feet above the sea-level. As it is cut off (from the rest of India) from the monsoonic influences by high mountains the precipitation is the lowest possible and nowhere it is more than 10". The rain falls during the cold weather storms. The temperature conditions present very extreme types like the dry regions of the Punjab. Some parts even have snow falls during this period.



Fig. 67.

The valleys have fairly fertile soils and some cultivation is carried on with the help of 'Karez' and flood water from the very small streams. Millets is the chief crop and the staple food. A little wheat and some fodder is also raised. Dates are important near the coast. Some fishing is also carried on the sea coast.

The total population in 1941 was 502,000 persons. Most of the people live in small villages and hamlets scattered all-over. The difficult relief and unfortunate climatic conditions combine to put the population figure very low—the average density being much below 10.* The majority of the people here lead a nomadic life and wander about with their flocks. Most of the people belong to the Islamic fold.

Only about 10 per cent of the people live in towns. It is however a reality that Quetta and perhaps Sibi are the only towns in Baluchistan. Quetta alone accounts for more than 70 % of the entire urban population. It is situated at the head of the Bolan pass which is so far the easiest and perhaps the shortest route between India and Baluchistan. The other route lies along the coast. A railway now runs along the north of the country to Persia.

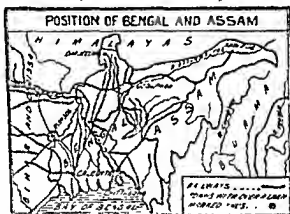


Fig. 68.
BENGAL

Bengal has an area of 82,876 square miles and a population of 61,640,377 and occupies a greater part of the lower gauges valley or the Delta Region. It is triangular in shape having its apex in the Himalayas and its base along the waters of the Bay of the Bengal in the south. The Ganges, the Brahmaputra and the Meghna are the most important factors in the geography of this Province.

Geologically the province presents a splendid unity, the small mountainous portions in the north and east and a small area in the west belonging to the slopes of Chotta Nagpur plateau being the only exceptions.

Dr S. P. Chatterji divides Bengal into three divisions according to soils :—

1. Residual soils of (a) the Eastern or Chittagong Hill Region (b) The northern or Himalayan region and (c) the south-western plateau region.

*There are more men than women and it is often noticed and two, three or even more persons have a common wife.

2. New Alluvium of the greater portions of the province lying near the many rivers. This type covers more than half of the area.

3. Old Alluvium of the regions situated away from the present site of rivers specially near regions under No. 1.

Climatically Bengal presents a transition between the constantly high temperatures and great humidity of the south of the Peninsula and the dry bracing air and great range of temperature which characterize the north-west (Kendrew). As a whole it is one of the rainiest of the provinces of India as it faces the S. W. Monsoons (Bay of Bengal Branch) earliest. Winter is comparatively a shorter affair. Summer has comparatively lower temperatures owing to greater humidity but the conditions are very damp and trying. The areas near the sea enjoy the sea-breezes. The rainfall is apparently the most important factor in the climate of Bengal which is primarily an agricultural country.

According to rainfall distribution,* Bengal may conveniently be divided into East and West. East Bengal receives an average annual rainfall ranging from 80 to 100 inches. The rainfall is as a rule regular and failure is very rare. Rainfall is ample specially during June—September, the period of summer monsoon. West Bengal receives an average of 50 to 60 inches annually. These low figures are due to the fact that Western Bengal is situated away from the direct route of the S. W. Monsoon (Bay of Bengal Branch) and comes under its influence only after it has been deflected westwards by the eastern hills and the eastern Himalayas.

According to present estimates about 60 per cent of the land in Bengal is under agriculture, 6 per cent is covered by forest (forests are mostly in Sunderbans and in the eastern and the northern hills). There is about 10 per cent of wasteland situated mostly in western Bengal, Barind and Madhopur. Rice is the chief crop covering about 75 per cent of the cultivated land. Jute is also important specially in the East.

The easiest and the most useful way to study a region like Bengal is to divide it into Natural Regions. Dr. S. P. Chatterji's scheme of Natural Regions of Bengal is very acceptable and we have used his scheme in the following pages. The account of these regions has also been summarized from his excellent account. He divides Bengal into the following regions.

- | | |
|---------|-----------------------------|
| | (1. Himalayan Region. |
| Uplands | (2. Chittagong Hill Region. |
| | (3. Rarh Region. |

*S. K. Sur's 'A note on the average intensity of Rainfall in Bengal'—*Calcutta Geographical Review*—June 1941, may be studied by ambitious readers.

†S. P. Chatterji, *The Flow of Geography in National Planning* Presidential Address before the Geography and Geography Section of the Indian Science Congress, 1942.

1. Barendra Region.
 2. Brahmaputra-Meghna Region.
 3. Bagri Region.
 4. Hoogly Region.
 5. Lower Ganges Region.
 6. Lower Padma-Meghna Region.
 7. Sundarbans Region.
- Lowlands (occupy a major part of Bengal,

1. The Himalayan Region is in the extreme north of Bengal and is also known as Sikkim Himalaya. The climate here is bracing and the region boasts of many hill stations. The rainfall is heavy and forests are the general feature. Mountain slopes upto 6,000 feet have been cleared for tea plantations. Higher up we have forests and alpine vegetation. Just at the foot of the mountains there is a belt of old alluvium having a heavy amount of rainfall. The region has unlimited water power resources specially in the Tista river, which await exploitation. Tea industry is the most important industry of the region.

2. The Chittagong Hill Region occupies the south east portion of the Province and consists of long parallel ranges encompassing between them four important valleys. These valleys are used for agricultural purposes, rice being the chief crop. Owing to heavy rainfall the region is as a whole covered with dense forests. Owing to its comparatively southern position and lower altitude, temperature conditions are lower here. The water-power resources of the Kamapali and other rivers await development. Besides rice, tea, sugarcane and bamboo are other products of importance.

3. The Rarh Region occupies a narrow stretch of land along the western border of Bengal and runs from the south of the Ganges to very near the sea board—comprising parts of Murshidabad, Bankura, Midnapore and the whole of Bardwan district. The region looks like an undulating plateau. The rainfall is not high, hence irrigation is the main problem. The Eden Canal, taken out of the river Banka, deserves mention. It has been supplemented by a cut from the Damodar. The Damodar canal with its headworks at Eakoi-Bera, is a later development. It is suggested that the flood waters from the rivers may be stored up for irrigation in dry periods.

4. The Barendra Region* occupies the Rajshahi division between the Ganges and the Brahmaputra. A great part of the region is 'capped' with old alluvium known as 'Barind'. A number of low hills with intervening wide depressions have been given to the region by fluvial erosion. The depressions have good soil for rice cultivation. Owing to low rainfall in some parts, irrigation is the main problem. Tanks are used in the central parts. Tobacco is the chief crop in East Barendra (Rangpur) and paddy in West Barendra which is the most populated part in the whole region.

*May be further divided into East, West and North Barendra.

5. The Brahmaputra-Meghna Region comprises the districts of Mymensingh, Dacca and Tippera. The Madhopur jungle in Dacca consists of alluvial tracts and is dissected by a number of streams. The chief rivers of the region are the Jamuna, Padma, Meghna and they are supposed to be rich in fish. The area is agriculturally good, the chief crops being jute and sugarcane. The region claims about 40 per cent of the total jute-lands of Bengal and about 25 per cent of sugarcane. Rice and oil seeds are also important (mostly *til* and *mustard*). The lower part of the Padma plain consists of fine loam and is certainly the most important agricultural region of Bengal.

The climate is maritime monsoon owing to the oceanic influences of the Bay of Bengal. The winter temperature is about 65°F. The annual rainfall is about 80" decreasing from north to south.

Owing to the lack of coal there is no manufacturing industry worth the name. If, however, the water-power resources of the Himalayan region were developed, things might take a turn for the better.

6. The Bagri Region lies to the east of the Rarh area and to the south of the Barendra tract. The area is a flat alluvial plain watered by a number of rivers chiefly the Bhagirathi (Hoogly), Jalangi and Mathabhangha which have for long constituted the chief means of transport. Now of course railways have taken much of the traffic.

The annual rainfall is about 55 inches. The mean temperature is 50°F in winter and 85°F in summer. The Kalantar tract between Bhagirathi and Jalangi is very arid and infertile and is usually referred to as the 'region of death' and its people are the first to feel the pinch of famine when it comes.

7. The Hoogly Region may be called the industrial centre of Bengal. The average rainfall is about 59", it being heavier in the south. Very little or no rain falls during the winter months. Jute and rice are the main crops and the yields of both are higher than perhaps in the rest of Bengal.

8. The Lower Ganges Region includes areas from Khulna and Faridpur districts. The rivers of this region, unlike those of the Bagri region, are still engaged in their land-building work. The chief problem of the region are the marshes which are, however, getting reclaimed for cultivation. The average rainfall is 73". Since the whole region is only slightly raised above the floor level the difficulty about finding a suitable site for building habitations is most acute. In several villages, houses are built on artificially raised ground.

9. The Lower Padma-Meghna Region is the wettest area in Bengal, average rainfall being 114. The land gets better and more fertile as we move away from the coast towards the hill region mentioned earlier. A number of small islands are found near the

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| Lowlands (occupy a major part of Bengal, | 1. | Barendra Region. |
| | 2. | Brahmaputra-Meghna Region. |
| | 3. | Bagri Region. |
| | 4. | Hoogly Region. |
| | 5. | Lower Ganges Region. |
| | 6. | Lower Padma-Meghna Region. |
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mouth of the Meghna, and these are being steadily reclaimed for agriculture, the chief crops being rice and betel palm.

10.* The Sunderbans Region occupies a large portion in the districts of 24 Parganas and Khulna. The region presents the appearance of marshes and swampy islands separated by river estuaries and a network of tidal creeks. The greatest problem is that of drinking water. The soil is very fertile and plant-growth is rapid which often creates complications for the cultivator who has to face forest clearing problems every year.

Fisheries of Bengal. It is an important topic and deserves special mention as fish forms an important part of a Bengalee's diet.

The area of water surface in Bengal is very large and it is doubled during the rainy season. The most important districts in this connection are in the lower half of the province. Bengal has about 8,000 sq. miles of fisheries during the dry season—the area during the rainy season is enormously increased.

Most of the fish in Bengal is had from rivers, canals, tanks, jheels and from river estuaries. The Chuka lake and the forested fisheries of Puri and Balasore are also important sources. Fish culture in tanks is large. Marine fisheries have hitherto been entirely neglected although they are very rich and hold huge potentialities.

The total supply, however, is not quite sufficient to meet the entire demand. The industry is carried on in the most unorganised and primitive manner and thus involves low yields and a lot of waste. Better methods and greater official attention is needed to put the industry on a sound economic and commercial footing.

The total population of Bengal is 61,640,377. Its density is about 616. The total urban population of Bengal does not exceed 5,000,000, out of which more than 40 per cent is found in the three cities of Dacca, Howrah and Calcutta. There are two types of towns in Bengal, industrial and non-industrial. The industrial towns like Calcutta and Howrah are centres of jute spinning, collection and pressing, coal and iron industries. About 90 per cent of the total population is rural. Most of them are engaged in cultivation of rice and jute. Only 8 per cent of people are engaged in industry and trade.

Calcutta and Dacca are the largest cities of Bengal, the latter is also the capital of Bengal. Titagarh, Bhatpara and Serampore are important jute manufacturing and rice milling centres. Asansol and Raniganj are important coal centres.

* Note. Dudley Stamp in his 'India' divides Bengal into four regions: (a) Northern sub-Himalayan region and Himalayan (b) Eastern Hills (c) Western plateau and (d) The Deltas region—further divided into (1) The Ganges-Brahmaputra Doab (2) The old delta or central and Western Bengal and (3) The New Delta and Surma Valley.

† See 'Fisheries of Bengal' by A. K. Banerjee (C. G. R. January 1942) from which we have drawn freely.

BIHAR

The combined province of Bihar and Orissa measuring about 111,702 square miles, was split up into two i. e. Bihar and Orissa in 1937. Bihar including Chhota Nagpore measures about 83,000 square miles and has a population of about 36,340,000 persons.

Bihar is purely an agricultural tract of land and exceptionally fertile. It forms the eastern portion of the Gangetic valley. The province falls easily into three regions.

(a) North Bihar | Middle Ganges

16) South Bihar } Valley.

(c) Chota Nagpur Plateau.

(a) North Bihar lies north of the Ganges and measures roughly about 21,796 square miles. It is a flat alluvial plain gradually rising towards the foot of the Himalayas. The north portion is characterised by a number of marshes and pools some of which are big enough to be called fresh-water lakes. The Kahar Tal in Monghyr and a chain of 43 lakes represent the deeper portions of the

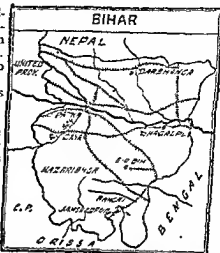


Fig. 69.

The region receives an average rainfall of about 50 to 55 inches annually. It is well distributed in the year and enables three crops to be raised. The northern part can depend on irrigation from the tanks etc. Canal irrigation is not possible as the rivers are non-perennial. Well irrigation is also not possible as the wells cannot stand owing to inundations. Agriculture is, therefore, insecure during draught years.

About 62·5 percent of the total area is cultivated, out of which only 10·3 percent is irrigated. The plain of Tirhut is the best area in the region and there the pressure on the soil is the maximum. Rice is the chief crop and claims 42 per cent of the cultivated area ; maize occupies 8 per cent, other cereals and pulses claim 32 per cent.

North Bihar is the chief source of saltpetre in India. Saliferous earth is found in the vicinity of villages.

The density of population is very high more than 600. There is considerable emigration specially to the tea gardens of Assam.

(b) South Bihar is the portion of Bihar lying south of the Ganges. It comprises the districts of Shahabad, Patna, Gaya and Monghyr. The greater part of it is an alluvial plain sloping gently northward to the Ganges but farther south the soil changes and becomes more undulating. Much of the southern area is a broken country with a

fringe of jungle. The soil is poor and has little or no irrigation. It yields precarious crops. The land to the north, on the other hand, is highly cultivated, extensively irrigated and well populated.

Its climate is drier than that of North Bihar. The annual rainfall averages between 40 to 45 inches. Some portions receive even less than 40 inches of rain annually. "In South Bihar rainfall is scanty and the soil is unretentive of moisture owing to the rapid drainage of the country. At the same time the system of storage tanks and water channels, (*Akars* and *Pynes*) has failed to ensure agricultural security, because under such a system the supply of water depends on local rainfall and fails completely when it is needed most and also because there is no rational control of the flow and distribution of water. Moreover canal irrigation, which is confined to small areas in the west, has little scope for development because excepting the Sone, the rivers are non-perennial and too small to feed any canal system."* Well irrigation has also no scope here. Only in south Bhagalpur and south Monghyr wells constitute an important source of irrigation. In other districts the rocky soil in the south has prevented the development of well irrigation. In the north of these districts, where the sub soil water is near the surface, well irrigation is superfluous. Moreover the demand for water during the critical period as *kathiya asterism* is too great to be met by wells, which are ordinarily suitable for the irrigation of the winter crops.

The following figures show the general agricultural situation :—

57·6 P. C. of the total area cultivated.

23·3 " " cultivable area cropped.

37·7 " of cultivable area irrigated.

Rice appears to be the main crop. The area under wheat is quite large. The most remarkable growth seems to be that of oil seeds. In South Bihar winter rice is a more important crop than the autumn rice. Winter rice, as is well-known, co-exists with a high degree of agricultural insecurity. "If there is a failure of rainfall during the critical period of *kathiya asterism* towards the end of September or the beginning of October, the winter rice crop cannot mature, because in this region it is not possible to irrigate the rice fields by artificial means to any considerable extent in the event of a failure of *kathiya* rainfall."† In South Bihar *aghani* is the principal harvest. The succeeding second crops, therefore, consist of cheap catch-crops because the more valuable *rabi* crops, like wheat and barley, are sown before the *aghani* crop is harvested. In abnormal years such catch-crops cannot

*Dr B. N. Ganguli, "Agricultural Regions of India," in "Economic Problems of Modern India" 1939, p 13.

† Trends of Agriculture and Population in the Ganges Valley, Dr. Ganguli, 1938, p. 181.

mitigate economic distress caused by the failure of the winter rice crop. Winter rice, together with the inferior *rabi* crops, raised by means of double-cropping, predominates in South Bihar.**

This region is rich in minerals. It possesses the richest mica mines of the world. Mica is quarried in the districts of Gaya and Monghyr. The total output of these districts in 1939 was 15,871 cwts of mica and the average daily employment in the mica mines was 779 persons. There are slate quarries in the Kharagpur Hills near Monghyr. "Several minerals are found in conjunction with mica. In the pegmatite veins which are the source of mica there have been discovered (i) large crystals of beryl with clear fragments that might be cut into aquamarines, (ii) blue, green and black varieties of tourmaline, (iii) small quantities of apatite (a phosphate of lime), which are thrown away with the waste mica, and (iv) molybdenum, which occurs as isolated plates".† But at present the latter are of minor economic importance.

The density of population is high but lower than the northern part of the province.

Like North Bihar, this region also loses heavily due to the emigration. The pressure on the soil and the absence of enough large scale industries to absorb host of landless labourers are the principal causes for this outflow of people. Most of the emigration is periodic. "Every year thousands leave their villages, after gathering the winter crops, to work in the mills, docks and factories or on roads, fields and railways in Bengal or Assam. They return, for the most part, with their savings after four or five months."

(c) *Chota Nagpur Plateau* is the elevated country extending from the Gangetic valley to the hilly tableland of the Central Provinces and approaching close to the Bay of Bengal on the South-east...(The word plateau is a technical expression for an area of which the lowest levels are at a considerable height above the sea). This region comprises the districts of the Chota Nagpur Division, the Santal Paraganas, Angul and the tributary States of Orissa and Chota Nagpur (area 66,624 sq. miles).

"It is a rugged region of inequalities, consisting of a succession of plateaux, hills and valleys, drained by several large rivers, such as the Damodar, Sarakar, Subarnarekha, Brahmani, Baitarani and Mahanadi. The land is still largely covered by forest, and is thinly peopled the whole area belongs to the same geological formation".‡ Numerous aboriginal tribes live here.

This region receives on an average a rainfall of 50 to 55 inches annually. In this tract the water runs quickly off the slopes so that the higher lands are soon dry, even after a heavy shower. For its

* Dr. Ganguli "Agricultural Regions of India" in "Economic Problems of Modern India", 1939, p. 1.

† Dr. Ganguli, Op. cit. p. 15.

‡ Bengal, Bihar and Sikkim L. S. S. D'Salla 1917, p. 24.

conservation the slopes are laid out in a series of terraces, fields spreading downwards in a fan shape. They have earthen banks at the lower side to retain the water, which passes down from field to field, moistening each in turn. Artificial irrigation is necessary in this tract for the cultivation of rice and other crops because of its rapid drainage. Well irrigation is used for winter crops.

In this tract there are extensive areas of rock and laterite and gravel, which are unfit for cultivation, and except in the valleys, the patches of fertile ground are small and infrequent. The region has very poor chances of a prosperous agricultural development.

The following figures throw light on the general agricultural situation in this region.

Percentage of Total Area		Percentage of cultivable area		Percentage of culti- vated area
Cultivable	Cultivated	Cultivated	Double- Cropped	Irrigated
57.1	30.4	53.2	4.4	10.2

Rice is the main crop. Maize is an important crop of the *khars* harvest in this region. This crop can be successfully grown over wide climatic ranges. It is a valuable crop as it matures early and ensures agricultural security. By supplying the cultivator with food it enables him to sell most of his *rabi* crops. Chota Nagpur agricultural resources are limited and failures of the harvests occur periodically, but scarcity does not press hardly on the hardy aboriginal races, who can supply their needs from the forest and, even in the good years, make considerable use of edible jungle products, such as the fruit of the *Mahur* tree.

There is considerable culture of *lac* in the districts of Ranchi and Manbhum.

The mineral wealth in this tract is great. Here we find the richest coal-fields in India. Fine coal mines are found at Giridih, Jharia, and Daltooganj. Coal deposits are also to be met within Sambalpur, though they are not so rich. Copper is found in Singhbhum. There are diamond mines in Sambalpur. Rich iron mines are located in Singhbhum and at Sakchi we have the Tata Iron and Steelworks, the greatest and the largest of its kind in India. In Hazaribagh there are some of the richest mica-producing mines of the world. Manganese is found in Singhbhum and there are some deposits of tin and antimony in Hazaribagh. Stealite is found all over Chota Nagpur.

The following figures give the normal yearly output —

Coal	...	14,843,633 tons
Iron	...	1,543,934 tons
Manganese	...	35,803 tons
Chromite	...	4,476 tons
Copper	...	360,216 tons
Mica	...	69,980 cwt.
Stealite	...	955 tons

This region is the home of numerous aboriginal tribes. There are Santals in Hazaribagh, Manbhum and Singhbhum; the Mundas in Ranchi; the Oraons in Ranchi and the Tributary States, the Hos in Singhbhum, and Gonds in the Tributary states. The name *Kol* is commonly used to designate these aboriginal tribes. Most of them have kept their purity of race and retained their tribal languages and customs, but some such as the Gonds and the Bhumijs have been largely Hinduized.

The unstable agriculture of this region as well as its topography has much to do with its low density of population, which is 260 per square mile.

There are very few large towns in Bihar. *Patna*, the capital, is also an important railway junction and an industrial town. *Ranchi* is the summer capital of the province. Other towns are Bhagalpur, Monghyr, Muzaffarpur and Darbhanga.

BOMBAY

Bombay Presidency has an area of about 76,443 square miles* and a population of 20,849,810. Upto 1947 Sindh was also a part of Bombay. Stamp divides the province into three natural divisions.

(1) *Gujrat* (including Kathiawar and Baroda) occupies a peninsula in the north and a portion of the province and consists of a good number of native states. Baroda state is made up of many isolated tracts of country north of Bombay. The region is a low plain occasionally dotted with small hills. Climatically it may be called a transition between the dry Sindh and the Thar in the north and the west central plains in the south. The peninsula of Kathiawar suffers from invariable rains. Cutch is even drier and more treeless than Kathiawar.

Baroda and Ahmedabad are the largest towns in the region. Baroda is the capital of the Baroda state and has important cotton mills. *Surat* on the Tapi was once a leading port of the west coast.

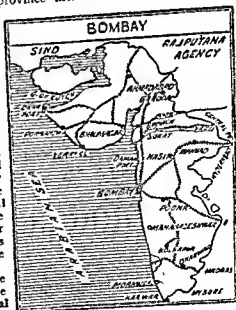


Fig. 70

*151,543 square miles including states and agencies and Sindh

(2) The West Coast Region is a very wet region, the rainfall being heavier towards the south. The hill slopes too receive heavy rainfall and are mostly covered with forests. The coastal plains were also covered with forests but now most of the area there has been cleared for cultivation of rice which is the most important crop and occupies more than half of the cultivated area. The region falls into four parallel strips (1) the mountain slopes (2) the flat alluvial plains below (3) near the sea are lines of sandbanks on which cocoanuts thrive and (4) the mangrove swamps that thrive at intervals therein.

The swift rivers of the slopes and the heavy rainfall there present great possibilities of water-power development. The Tata's schemes are already well-known.

Bombay is the only large town and the most important port of India.

(3) The Bombay Deccan (or the Deccan Lavas Region) means that part of Bombay that lies behind the Western Ghats stretching inland for more than 190 miles. During some geological period this area was covered with great sheets of lavas which have now withered into a dark soil suited for the growth of cotton*. Roughly the region measures about 53,327 square miles and has a population of 11,606,000.

The area lies in the rain-shadow of the Western Ghats and has an average rainfall of about 20 to 25 inches. The southern parts get somewhat heavier rainfall. The valleys of the Godavari, Bhima and Kistna are the best portions of the region and it is here that the deep black soil is met with. The main agricultural problem of the area is the water supply.

About two-thirds of the total area is cultivated. Some part of the region is covered with forests specially on the slopes of the Western Ghats. Only about 4-5 per cent of the cultivated area is irrigated. Most of the crops grown here are dry crops.

Jowar— 30 per cent of the cultivated area.

Bajra— 25

Cotton—13

Pulses—10

Rice— 2

" "

" "

" "

" "

Jowar and Bajra are the staple food of the people. The different sub-zones of cultivation centre round the main staple Jowar. The best agricultural regions occupy the adjoining banks of the Godavari and the southern districts of Karnatak. The tract between the Godavari and the Bhima is also agriculturally important. Another good region extends from Khandesh to Belgaum along the eastern slopes of the Western Ghats. Owing to a lack of rainfall irrigation is best developed in this region. Fruit and vegetables are important crops of this region.

No minerals of any importance except some pottery clays, specially in the Belgaum district are found in this region.

Poona and Sholapur are the most important cities. Poona is the summer capital of the province and commands one of the gaps leading to Bombay across the Ghats.

* Besides having a portion of Bombay, it also covers Baroda and Western Hyderabad.

CENTRAL PROVINCES AND BERAR

The total population of the province is about 20,49,840, out of this about 65 % are agriculturists, while only 10 to 12 % are engaged in industries or allied trades.

Not many persons are engaged in mining, salt and saltpetre being the most important items. Manganese is also important. The density of population in Bombay is about 175 persons per square mile. The scantiest population is found in Kathiawar, Cutch and in North and Central Gujrat. The density in the Deccan is moderate, about 216 in 1941. South Gujrat, the west coast and the valleys of Nerbada and Tapti are thickly populated.

CENTRAL PROVINCES AND BERAR

The Central Provinces and Berar occupy an area of about 131,557 square miles in the heart of India and have a population of 116,813,000. Many Indian states of different sizes are included in this region.

C. P. and Berar is one of the richest areas of the country both from the point of view of agriculture and mineral resources. It is, therefore, unfortunate that the level of economic development of the province is very low. The chief minerals of the region are coal, bauxite, manganese, iron and copper. Although there are vast reserves of coal (17 centres in Chattisgarh area; 8 in Panch valley, 5 in Kanhan valley, 12 in the Satpura region and 10 in the Wardha valley) only a small percentage has yet been exploited. The chief reason for this slow development of mineral industry is perhaps the very poor state of transport facilities. Other minerals too have only been ill-developed for the same reasons. Bauxite occurs in the Bihar Plateau and in the Kathi-Marwara Basin. Copper occurs in Salemabad, while iron fields are situated in Katni, Saugor, Chanda and in Pranhita valley besides a few other centres. At present there are about 140 smelting centres. Most of the manganese mined in the region is exported. To prevent 'this drain of the national resources' the development of ferro-manganese industry seems desirable.

The forest wealth of the province is also vast. Besides timber, lac and wild silk are gifts that are there without being taken advantage of. There are also a number of rich pastures. Only about 38 per cent of the total area is cultivated. The chief problem of the province is irrigation. Only about 4 per cent of the cultivated area is irrigated. Rice, cotton and wheat are the three chief crops of the region and they occupy distinct regions in the province. Cotton predominates in Khandwa lava plains, Tapti alluvial basin and in the Purna valley. Rice

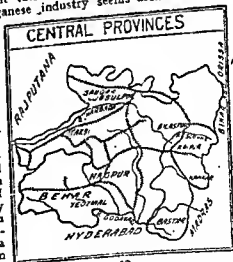


Fig. 69

is the chief crop in the Chattisgarh plain. Wheat occupies a definite block in the western half.

Berar has an area of 17,808 square miles and was leased in perpetuity to the Central Provinces in 1903 by the Nizam of Hyderabad whose property it became in 1853. It is the most developed region of the combined province and has rich cotton soil. Cotton is the chief crop of the region. It is first collected at Amraoti and Akola and then sent to the Bombay mills.

It is very fortunate for us that recently two Calcutta professors made a detailed regional survey of this area and divided it into 13 physiographic divisions*—certainly an improvement over Stamp's Regions.

- (1) The Saugor-Damoh Plateau.
- (2) The Marwara Basin.
- (3) The Narmada Basin
- (4) The Northern foothill zone of Satpura.
- (5) The Satpura Hills.
- (6) The Purna Valley.
- (7) The Southern Plains.
- (8) The Balaghat Bhandara Hills.
- (9) The Ajanta Plateau.
- (10) The Chattisgarh Plain.
- (11) The Korea Chand Bhakar Plateau.
- (12) The Surgija Basin
- (13) The South-eastern Plateaus

As this is the best division that we have come across so far, it has been thought useful to summarise the relevant portions here. Those wanting to know greater details should read the paper by Chatterji and Basu as given in the Calcutta Review (See footnote).

1. The Saugor-Damoh Plateau really forms the south-eastern extension of the Malwa plateau (north of Vindhya). Its elevation is from 1,000 to 2,000 feet. The higher elevation of its western part is clothed with teak forests. The plateau is drained by many streams flowing northward through broad valleys following the general slope of the region. The eastern plateau is formed of sandstones of Vindhayan age covered with thick newer alluvium in the north. The town of Saugor is situated in the lava country and Damoh on the Vindhayan sandstones. An alluvial plain extends northwards from Damoh. The Marhattas developed this town as a defensive

*S. P. Chatterji and Balkrish Basu, "The physiographic and economic basis of urbanisation in the Gond, and adjoining lands of the Central Provinces"—*Calcutta Geographical Review*—March 1944

point and an old fort stands as a reminder of the past. The population has grown to 63,933 in 1941 from 42,330 in 1901. Asbestos and lateritic iron ores are found in the locality though they are not developed industrially. The town of Damoh with a population of 28,795, is a collecting and distributing centre for the local trade. Both of these towns have developed economic contact with Cawnpore on account of easier communications across the Malwa plateau.

2. **Murwara Basin.** This basin is really the northern extension of the Narmada valley. Its average elevation is 1,200 ft. The basin has a distinct industrial character. There are large units of cement and lime works at Katni and Murwara dependent upon limestone and shale obtained locally. The population of Murwara at the last census was 24,630. There are good deposits of bauxite near Katni, the alumina content ranging between 40 and 65%. The area is also rich in other metallic minerals, copper and iron ores, which, if properly utilized will help in the development of metallurgical industry in this area.

3. **The Narmada Valley.** The valley extends from Sihora on the north east to Handia on the west and covers an area of over 4,000 sq. miles. The elevation of this province varies from 1,500 ft. on the west to about 1,000 ft. on the east. The Narmada river flows along the northern edge of the valley from near Jubbulpore through alluvial basins alternating with rocky gorges. The northern portion of the valley is occupied by the headwaters of the Hiran, a tributary of the Narmada. To the immediate north of the river rises boldly the Vindhyan mountains presenting a steep cliff southward. The northern limit of the valley is, therefore, determined by the east-west running Vindhyan scarp. The valley extends southward as far as the foot of the low hills formed of upper Gondwana sandstones, and at the two ends the alluvium-filled valley merges into lava plains or plateaus.

Agriculturally the Narmada valley is a very productive area. Wheat forms the staple crop, though in the eastern part of the valley rice gains importance due to higher precipitation. Water for agricultural purposes is obtained from deep wells sunk along the edge of the plain. The valley slopes being steep, the waters of the Narmada cannot be utilised for irrigation purposes. The topography of the Narmada valley is such that it does not offer much opportunity for the development of urban centres on the river itself.

Jubbulpore is the most important town in this zone dominating the economic activities of the people. The presence of a rocky basin close to the Narmada provided an excellent site for the location of the city. The low hills overlooking the city gave it a defensive advantage. To-day important industrial, commercial and administrative functions are integrated in this city. As in the modern industrial establishments mention may be made of cotton mills, an electrical generating and transforming station, oil mills, sugar factory

and cement and lime works. The collection and distribution of the agricultural products of the valley and the neighbouring areas are the most important commercial activities of the town. Railways radiate from the town in three directions: the first, linking it up with the town of the middle-Ganges valley in the north, the second, connecting it with the towns of the Narmada valley and beyond; while the third getting it nearer to Nagpur, the administrative and the industrial capital of the country. Jubbulpore still possesses a flourishing trade in the handicraft products, especially in the images carved out of marble and soapstone which are found within the area. Deposits of bauxite occur in many places in the Jubbulpore region. An aluminium industry can be developed at Jubbulpore if cheap power can be brought to this area. Thermal power station located on the coalfields of Korea, Mohpani or the Kanhan valley can transmit power in bulk to Jubbulpore or the raw material can travel to the power sites if the latter are developed on a large scale. Jubbulpore has an important trade in building stones. The marble is exported in large quantities. The town has developed wide regional contacts and is attracting to itself the economic activities of the Narmada valley. With further development of the geographic and economic realities of the region the city is destined to develop into an important metropolis of the country. West of Jubbulpore stands Narsingpur on the small stream Singri. Narsingpur exports the timber wealth of the Chhindwara forests. Pink marble is found in Narsingpur. Iron ores both hematite and limonite occur irregularly distributed in the area but the town does not seem to profit by their occurrence. Gadarwara stands on the Shakkar, another south-bank tributary of the Narmada. It is an important grain exporting centre of the region. It cannot boast of any modern industrial plant but handicraft trade in weaving, pottery etc. are carried on. Ceramic clays of the Chhindwara and Jubbulpore area are utilised. Itarsi is growing into a very important rail road junction. It carries the major portion of the outgoing commodities of the neighbouring area. Its population at the last census was 14,269. Hosangabad is perhaps the only important urban centre situated on the bank of the Narmada, at a point where crystalline rocks are exposed in the valley floor which provide building materials to the town.

4 Northern Foothill Zone of The Satpuras. This province extends in the same direction as the Narmada valley province, hemmed in-between the Satpuras on the south and the Narmada on the north. It can be divided into a number of sub-regions: (i) Khandwa lava plain on the west; (ii) Morand sandstone plateau; (iii) Pachmarhi hills including the Dera synclinal valley; (iv) Dudhi sandstone plateau; and (v) the Lakhnadon lava plateau on the east. The height of these plateau increases from 1,000 ft. on the west to 2,000 ft. on the east. The ground also rises southward to about 3,000 ft.

The *Khandwa lava plain* is bounded on the east by the Morand, which joins the Ganjal at Chidgaon. There are several hills with flat summits rising above the general level. The valley of the Chota Tawa contains rich black soil and is extremely fertile. The *Morand plateau* is bounded on the west by the Morand and on the east by the Tawa. The Morand plateau is formed of sandstones of Upper Gondwana age and has been considerably dissected by rivers which deposit enormous quantities of sands along their banks, causing deterioration of soil. The *Pachmarhi region* is also formed of sandstones of the same age, but here the plateau rises to a much higher elevation. The natural scenery around Pachmarhi is magnificent. North of the Pachmarhi plateau flows the Denwa river through a synclinal valley. The northern part of the region has a rugged expression. To the east of the Pachmarhi plateau there occurs another sandstone plateau rising above 2500 ft. Further east stands the *Lakhnadon lava plateau* region, a rolling country of alternate ridges and valleys. This is heavily forested. A number of gorges have developed in this area in-between the Dudhi and the Sher. Soil erosion is very pronounced.

The western part of the Khandwa lava plain is agriculturally important. Cotton is the main crop, though wheat, oilseeds and jowar also occupy appreciable acreages. The only city of importance within this area is Khandwa. The prosperity of the town is based on the trade in cotton. It is a very important centre of raw cotton export and the ginning and baling of cotton in preparation for the market is the characteristic industry. Iron ores are also found in the Bijawar rocks in the district of Khandwa, the ores being hematite. They were largely used by indigenous industries. The Tawa valley provides excellent sites for establishing new industries. Here the problem of water supply can easily be solved by sinking artesian wells in the Denwa valley, a tributary of the Tawa. Coal beds of Upper Gondwana age occur in the Morand Barakar coal beds near Mohpani in the Dudhi sandstone plateau. Along the northern edge of the sandstone plateau lentils of earthy hematite are abundant. Mica and copper also occur but have not yet been opened up. There are good deposits of clays quite suitable for fire bricks. The sandstone plateaus are well timbered. The northern foothill zone of the Satpuras is devoid of large scale cultivation. The soils are thin and sterile. Agriculture is, however, carried on in little patches of fairly level land that have been cleared of forests; wheat in winter and millets, oilseeds and sunhemp in autumn are the characteristic crops. But these lands form excellent pasture meadows when cleared of timber. In fact it is a very important cattle breeding area.

Pachmarhi is the only town of any importance on the sandstone plateau. It is the summer seat of the government.

5 The Satpura Hills consist of a number of parallel ranges and plateaus. This physiographic province consists of the following sub-regions: (i) Satpura Range; (ii) Tapti basin; (iii) Tapti plateaus of Multai and Khamla; (iv) Chhindwara upper plateaus and Mahadeva hills; (v) Chhindwara-Seoni lower plateaus; (vi) Mandla-Balaghat plateaus of Paraswara, Haihar, Ramnagar and Ramgarh.

The Satpura range descends westward from an elevation of about 3,000 ft. near the source of the Ganjal river to just over 2,000 ft. north of Burhanpur. The range slopes rather gently northwards but presents a line of cliffs on the south overlooking the Tapti valley. The whole of the range is formed of basaltic lavas. Asirgarh is a strategic point commanding the route to Deccan from northern India. The eastern half of the Satpura range is more rugged. Timber forms the main wealth of the region and agriculture plays a very subordinate role in the economic life of the people. Roads are few and far between.

The Tapti occupies a rift valley, south of the Satpura range. The whole of the basin is formed of basaltic lavas. The valley slopes of the Tapti are too steep for agricultural purposes, except where the valley widens and is filled up by older alluvium. The town of Burhanpur stands on this rich alluvial patch. The Tapti basin is being gradually opened up for cultivation. Forests still predominate in many parts and provide a valuable source of income. The region too exports its cotton to the Bombay market. Burhanpur has a considerable trade in the export of raw cotton. It has two large cotton mills and many cotton ginning and baling factories. There is also an oil mill in the town.

The mineral resources of the valley have not yet been fully exploited. Some oil wells are situated in the northern parts of Cachar. Some platinum is washed out from the banks of Dibing river. There are valuable coal deposits in this region. Coal seams outcrop in most of the deep river plains. Limestone outcrops beyond Barasansa.

To the east of the Tapti basin lies the Tapti plateau, the highest lava plateau in the Satpuras, rising to an altitude of 4000 ft. The Tapti divides this into two parts—the (eastern) Multai plateau and the (western) Khamla plateau. Both of these are rolling uplands and support long grasses. Subsoil water is close to the surface and water can be obtained easily for irrigation. The Tapti, Wardha and Bel rivers rise on the Multai. Near the source-spring of the Tapti has sprung up the religious town of Multai, now well connected with metalled roads. The region watered by the Machua and the Bel is a rich and fertile tract. A number of villages including the towns of Betul and Badnur have sprung up in the valley zone.

North of the Betul valley rises another high plateau, which extends east-north east from the Machua valley to the Wainganga.

In fact it consists of three plateaus separated from each other by the Kanhan and the Pench rivers. The eastern plateau is composed of basaltic lavas and contains red soil which is valued as the best for timber trees. The greater part of the plateau is covered with forests. The steep slopes support dense vegetation, but the cliffs are almost bare. There is a future in the coal fields when they are opened up. The lack of transport is another factor conditioning the backward state of the area.

To the south of the central plateaus stand a group of lower plateaus with an average elevation of about 2000 ft. Generally speaking, the low-lying tracts contain rich black loamy soil, the slopes brown loam and the tops gravelly red soil. There is excellent pasturage throughout the region, and hence cattle are bred specially in the Kanhan valley, west of Chhindwara and along the edge near Khamarpaoi and Kurai.

Chhindwara is situated at an elevation of about 2000 ft. The town is only a centre of local trade. The handicraft trades in pottery and weaving are quite important. A small quantity of tassar silk, obtained from wild cocoons, is woven in the town. Marble and ceramic clays of the district are being used. Although bauxite and marble occur in the locality, they are not exploited to any great extent. The coalfields of the Chhindwara district are only inadequately surveyed. Power generation in these fields will open up the country for proper exploitation of the resources. Manganese ores of good quality occur in the district and are exported.

The easternmost part of the Satpuras consists of a number of high plateaus bordered on the east by a line of eastward-facing escarpments, known as the Mekhala range (Maikala). This range runs in a north-easterly direction from Nandgaon to the Amarkantak knot and then turns northwest till it meets the Vindhyan scarp north of Jabalpur. It appears that the Mekhala range properly marked the site of an ancient shore line, to the east of which sediments of the Cuddappah age were deposited, and that in the Deccan trap period the range had prevented the lava flows from flowing further east. To the north of the Narmada river the plateau has been dissected into rugged hills; very few fertile valleys occurring in them. Hence it is thinly populated. The country is more open and contains rich fertile tracts.

The Parasoara plateau lies between the Banjar to the west and the Wainganga on the east. It has sandy soils and no agriculture.

The Baihar plateau rises to an average elevation of about 1800 ft. It is watered by the northward flowing Banjar river which near its confluence with Narmada flows through rich loamy soil. This tract is intensively cultivated. Elsewhere the soil is sandy and infertile and clothed with dense forests.

Further east lies the Ramnagar plateau on which rises the headwaters of the Burhner. This is covered with rich black loamy soil. It is also an important timber area, and the sal forests are capable of yielding good crops when cleared.

The Ramgash plateau is the easternmost one, rising to an altitude of 3000 ft. and is composed of basaltic lavas. It is watered by the Khermer and a number of short perennial streams. It has immense agricultural possibilities.

The town of Mandla standing at the confluence of the Banjar and the Narmada, is the only centre of any consequence. The economic resources of the region still remain undeveloped, although there are rich bauxite deposits in the Banjar plateau. Coal and metallic minerals occur not very far from each other.

6. The PURNA VALLEY Like the Narmada valley the Purna valley is a structural and topographic depression. The Purna flows through an alluvium filled valley.

The Purna valley is a distinctly *urbanised* zone, containing as it does 16 large towns. The prosperity of the valley zone is due to cotton, which forms the staple crop of the area. It contains all the best lands in Berar and supports a large population. The deep rich black soil has been cultivated from time immemorial but the fertility does not seem to deteriorate. Of the total cultivated acreage cotton occupies 45.1% of land in Akola district and 49.9% in Amraoti district, which shows the importance of the crop in the valley. The cities within the valley are all engaged in the cotton trade.

Akola is the first town of the Purna valley in size, with a population of 62,561. The industrial activity centres round the preparation of cotton for the market. There are two large cotton factories, two oil mills, and many small cotton ginning and baling presses. Export of cotton to the Bombay market forms the chief commercial activity. The town of Malkapur trades in cotton. Aknt has a large cotton market. Cotton carpets of Aknt have a local reputation.

7. The SOUTHERN PLAINS are to the south of the Satpura plateaus. The western part of this physiographic province as far as Nagpur town, is composed of basaltic lavas, covered with lateritic soils. But the plains to the east of Nagpur are covered partly with river alluvium and partly with residual soil. This physiographic province can be divided into seven sub-regions:—(1) Nagpur plain, (2) Wainganga valley, (3) Katangi-Ballahat plain, (4) Sausar upland plain, (5) Arvi upland plain, (6) Wardha plains and (7) Chanda plain.

The Nagpur Plain rises to an altitude of about 1,000 ft. and extends from the Pilakpur hills in the neighbourhood of Katol on the

west to the Ballahi hills on the east. Small flat-topped buttes, like that of Sitabaldi in Nagpur city, break the monotony of this level tract. Practically the whole of the plain is drained by the Kanhan and its main tributary, the Pench.

The town of Nagpur stands upon the eastern edge of the lava plain. Nagpur is the administrative centre of C. P. The city shows the characteristics of a growing metropolis. In this city the commercial, industrial and administrative functions of the province have integrated to a considerable degree. The city stands on a small stream, the Nag. To the east and south-east the city overlooks the expanse of open plains. The railways connect Nagpur with Bombay and thus have opened up the Nagpur plains for the export of cotton to the Lancashire market. The trade in cotton is the real foundation of the prosperity of Nagpur. The exploitation of the Manganese ores and marble in the neighbourhood of the city form the second major base for its prosperity. The Manganese ores are sent to Bombay which exports them in overseas market. Nagpur has thus developed wide regional contacts. It is also an important export centre of timber of the Satpuras, mainly teak, sal and satin wood. Today it boasts of ten large industrial establishments. It is also an active distributing centre of oranges. It is an important railway junction, one line linking it up with Hoshangabad in the north across the Satpuras via the important town of Betul; the second system linking it up with the towns of the Purna valley; the third leads to the south via Wardha; and the fourth important system leads to the east linking it up with Rajpur, Bilaspur and Raigarh. There are branch lines as well leading to Chhindwara, Umrer, and other towns. Thus Nagpur to-day forms the *hub* of some of the important railway communications in the centre of India. This fact in itself emphasises the regional dominance of the city in this part of India.

The Wainganga Valley is situated to the east of the Nagpur plain. Its maximum width is about half a mile. The main valley and the tributary valleys are studded with large artificial lakes, which were constructed in the past for irrigation. Hence this tract is known as 'the lake region' of the Central Provinces. Bhanadra stands on the right bank of the Wainganga, a few miles up its confluence with the Kanhan. It is an old fort town. Handicraft trade in brassworking and cotton weaving is declining. Rice is the main crop of the area. The neighbouring forests yield valuable timber.

The Katangi-Balaghat Alluvial Plain occurs in the north-east of the Ambargarh hills, and extends from the Bawantbari valley to that of the Wainganga. It is fringed on the north by the foothills of the Satpura range and slopes to the east. The eastern part contains deep black soil, and hence is more intensively cultivated and thickly populated. The rocks in the neighbourhood of the town of Balaghat are conspicuous for their development of iron ores, and also contain copper and lead ores.

The Sausar Upland Plain lies to the north of the Nagpur plain and extends up to the foot of the Satpura hills. The surface is undulating with an elevation of 1,100 ft. Here the thin brown soil needs manuring and will then produce excellent crops of cotton and millets. It is watered by a number of perennial streams including the Kanhan. The plain is mainly formed of lavas. The towns, Sausar and Malegaon stand on the eastern edge.

The Arvi Upland Plain extends from the Nagpur plain on the east to the Wardha valley on the west. It is composed entirely of lava flows and has been much dissected. A greater part of this tract is unculturable. Cattle are, however, bred in this tract. Timber trees are grown.

The Wardha Plain is the largest physiographic province composed of lavas and a deep layer of black loamy soil in the valleys of the Wardha and Bembla and other smaller streams, which yield good crops of wheat, cotton and lin-seeds. The town of Wardha dominates the economic activities of the region. It is a very important cotton market. There are many ginning and pressing factories. The Wardha valley coalfields have played no small part in the development of the cotton factories of the region.

To the south of the Wardha plains occurs another lowlying tract—Chandu Plain. The soil here is sandy and infertile.

8. THE BHANDARA-CHANDA HILLS are a forest-clad hilly country separating the southern plains from the south-western rim of the Chhattisgarh basin. There are quite a large number of lakes in this area which occupy depressions surrounded by high ground. These storage tanks, and ample surface run off of water make this region suitable for rice cultivation. It is a distinctly rural area.

9. THE AJANTA PLATEAUS:—From the southern edge of the Purna valley rises slowly yet another plateau province, traversed by the famous Ajanta range. The plateaus are mainly composed of basaltic lavas and contain rich black loamy soil. It was one of the most important agricultural regions of India before the country got involved in the wars of the 18th century. Since then the country is slowly recovering and more land is being brought under the plough every year.

On the shallow water-parting between the Purna system and the Wardha system stands the town of Amraoti. Amraoti has a trade in cotton. It is the principal cotton market in Berar. The railway takes all the cotton of the area to the Bombay market.

10. THE CHATTISGARH BASIN:—The famous Chhattisgarh basin has an average elevation of 1,000 ft. on the west and south, and 750 ft. on the east. The basin is drained by the Mahanadi river system. The main river, however, carries very little water except in the rains before it is joined by the Seonath, as its bed is composed mainly of porous sands. It flows close to the eastern

edge of the plain until it leaves it through a narrow gap, a few miles south-east of Raigarh.

The Chattisgarh Basin covers an area of about 10,000 sq. miles. It forms like the Narmada valley and the Purna valley a distinctly progressive zone. Although rural character dominates the plain there are some important urban centres within the valley. The town of Bilaspur stands on the river Arpa and is connected with the main railway net of the country. It is a rapidly growing town having a flourishing trade with Bombay. Mica is mined in the locality. An interesting feature of the handicraft industry is the weaving of tasar silk from the wild silk cocoons of the neighbouring forests. To the east of Bilaspur stands the ancient fort town of Raigarh. The town exports considerable quantities of tasar silk woven in the locality. Raipur is situated on the Kharun and is the most important commercial town of the Chattisgarh basin. It is an ancient town of considerable historical interest. Raipur has a tremendous future if and when the resources of the country are exploited on a planned basis. It can form the site of a possible cement industry. Drug has the ruins of a mud fort of great antiquity and has not grown much. Its future lies in the exploitation of the very plastic white clay that are found in the neighbourhood. Lateritic iron ores are exposed in large quantities, while deposits of valuable iron ores are known to occur. Dhamtari has a population of 14,071, and the linking up of the town with Raipur has opened a new chapter in the history of its development. It now collects the products of the southern part of Chattisgarh basin and also the exports of the northern part of the Bastar region. Lack of communications and inadequate exploitation of the resources of the region are holding up the economic development of the Chattisgarh basin.

11. THE KOREA-CHAND BHAKAR SANDSTONE PLATEAUS rise north of the Pendra upland. First comes the southern plateau with an elevation of about 2,000 ft., to the north of which extends the Sonhat plateau, some 500 ft. higher. Further north lies the Decgarh plateau, the highest in the area. The plateaus contain excellent pastures, which are leased to the cattle breeders of the neighbouring states of Rewa. The forests cannot be fully utilized for want of transport facilities. The area has rich coal and iron deposits. The former have been opened up in recent years.

12. THE SURGUJA BASIN LIES east of the Korea plateau and is a fertile level tract composed mainly of lower Gondwana rocks. This tract contains good pastures, to which cattle from the neighbouring areas are taken every year. The uplands and valley slopes are covered with sal forests, which cannot be utilised for want of good transport. The floor of the basin is more thickly populated where stand most of the villages including Ambikapur, the capital town of the State of Surguja. There are extensive exposed and concealed coal deposits in this area which cannot be properly utilised until this area is connected with other progressive

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regions by roads and railways. Because of the absence of the development of economic resources, there are no real towns.

13. THE SOUTH-EASTERN PLATEAUS :—The greater part of this physiographic province in the south is included in the Bastar State. The northern division is a part of the Raipur district and the Kanker State. The two divisions—northern and southern, are separated by a narrow water parting striking east-west in between the Mahanadi and Godavari drainage systems. The Kanker plateau rises to a height of 2,000 ft. and is composed of granitoid gneiss, and is much dissected by the headwaters of the Mahanadi which forms a typical rectangular drainage pattern, controlled by faulting in the rocks. Kanker, the capital town of the State stands on the Dudh and could not develop for want of good roads and railways. To the east of the Kanker plateau lies another still higher and extensive plateau, known as the Khariar-Nawagarh plateau, with an average elevation of 2,500 ft.

To the south of the Khariar-Nawagarh plateau occurs the plateaus of the Bastar and adjoining states.

Further south lies the Chitrakot plateau with an average elevation of 1,800 ft. The plateau is covered by sandy loam, well suited for rice cultivation, provided there is a good supply of water.

West of the Chitrakot plateau, the ground rises and forms a much more rugged country. The Indravati cuts across the hills through a gorge. This is the favourite country of the Gonds, and known as the Ambujmar track. The rocks are sandstones and shales, similar to those of the Aravalli mountains. The radial drainage pattern of this area is very conspicuous.

The greater part of the plateau just described contain valuable timber trees—sal and teak, which can be better utilized with the development of roads and improvement of marketing facilities.

Many other tribes are also found in these regions. The people present a rather wider pattern as during the many centuries gone by waves of immigration flowed into the province from all sides. The earlier inhabitants were driven into the hills and the forests. The main divisions of the settlers are indicated by the language divisions of the province. The north-east part of the province is inhabited by Hindi-speaking people who came from the north. Marathas (speaking marathi) are found in Berar, and in the Central and Western part of the province. Gonds is spoken by the tribes. The tribes are gradually being absorbed into Hinduism. The people are predominantly agricultural. The second most important occupation is the exploitation of minerals.

A mention has already been made of the chief towns of the province. Nagpur, the capital, and Jabalpur, a very important railway junction, are the most important towns.

MADRAS

The Madras Presidency has an area of about 124,363 square miles (excluding the States), and a population of 49,342,000. The chief states of Travancore, Cochin and others are now directly under the Government of India. The province is second in area amongst the Indian provinces and it is bigger than Belgium, England and Wales, Great Britain, Prussia and Italy. It has a total coastline of 1,700 miles—1,250 miles along the Bay of Bengal and 450 miles along the Arabian Sea. The entire province lies south of the river Kistna and Tungabhadra. On the east it is traversed by a mountain range of the Eastern Ghats dividing the province into a coastal plain extending from Ganjam to Cape Comorin. The Western Ghats descend along the western coast (called the Malabar coast), right down to the Cape, reaching a height of more than 8,500 feet in the Nilgiris-Dodaletta Peak.

The Rivers Kistna, Godavari, North Pennor, Palor, South Pennor and Cauwari—most of which flow from west to east, drain rather irrigate the country. It is only in the delta regions of these rivers (chiefly Kistna, Godavari and Cauwari) that extensive irrigational schemes have been introduced.

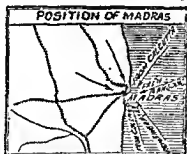


Fig. 70

The proximity of the sea has rendered the climate free from extremes. The rainfall on the western coast and on the slopes of the western ghats is heavy but as we cross over to the east, it lowers down considerably and comes mostly during winter months from the retreating monsoons. In the central table-land on the east coast, rainfall is small and heat during summer months quite excessive. Rice, millets, ragi and pulses are the principal crops of this province. Cotton is grown in Tinnevely, Coimbatore, and Belleary. Tobacco is grown in Madura and Coimbatore. Coffee is also largely grown in this province and also in the States of Mysore, Travancore, and Cochin. Rubber is grown principally in Travancore, and Cochin. Agriculture is the principal means of livelihood of the province. Irrigation has been successfully and profitably carried on in the

province, the area under irrigation in 1939-40 being about 6.5 million acres, interest earning from productive irrigation works being 6.36% of the capital at charge. There were 1,841 factories employing 197,248 hands in 1939-40. In 1934-35 there were 8,818 miles of road out of which 24,551 were metalled. There were about 5,100 miles of railway lines. The principal ports of the province are Madras and Cochin, both major ports. The population is mainly rural and the principal cities of the province are Madras, Madurai, and Trichinopoly. Hindus form about 90% of the population of the province. There are large numbers of Indian Christians in the Presidency and they constitute nearly 6% of the total native Christians in India. There are 3 universities in the Presidency, Madras, Andhra and Annamalai.

Now to have offer a brief general summary of the geography of the province, it seems useful to divide it into the following natural regions.

1. The Northern part of the East coast or the Northern Circars.
2. The Southern part of the east coast or the Carnatic Regions.
3. The Deccan plateau. 4. The West coast Region.

The Northern Circars cover an area of about 31,532 sq. miles and have a population of more than 12,000,000. The region occupies a widening strip of land stretching from the line of the sea to the foot of the eastern ghats. The fertile delta of the Krishna and Godavari fall within its boundaries. The soil is pre-eminently alluvial and the land presents a flat monotony.

The climate here is characterised by uniform high temperatures and moist air. A unique feature is the fact that most of the rainfall occurs during winter months from the retreating monsoon. Thermometer never falls here below 75° F even in January. The average rainfall is about 40" annually. Both the monsoons contribute their quota but there are no spring rains.

Soils which are of the red type predominate in the region and as such irrigation becomes a necessity. The irrigation systems of the deltas are modern and also allow navigation in the main canals. In the deltas more than 80 percent of the lands is irrigated. But still there is great scope for an extension of irrigation.

The region has no towns of any great significance. It is poor in the matter of ports also. Agapatan and Coconada are the only ports worth the name. As we learnt earlier, Vizagapatam has a new artificial harbour. Vizianagram is an only inland town of any importance.

2. The Carnatic Region (or Tamil Region) occupies an area of about 23,200 sq. miles in the Southern part of the eastern coast of the Madras presidency. In 1941 the region had about 11,511,600 inhabitants. Going from West to East, the relief changes over from hills to plains and the region could be easily divided into an eastern plain (coastal) region and a western hilly region. Old hard crystalline rocks are found in the western half of the region while the eastern half is composed of young alluvium and has the best agricultural areas of the province. The hills have important mining industries.

Climatically this region is quite different from the rest of India as it receives most of its rainfall during October, November, and December from the North East Monsoon. During the season of South West Monsoon, the region lies in the rain-shadow of the Nilgiri and Andaman hills. The average rainfall is about 30 to 35 inches annually. In the eastern plains, therefore, irrigation is a dire necessity and canal irrigation is largely carried on there, the Periyar Project, the Cauveri Delta system and the Ponnai, Palor and Cheyyar systems deserve special mention as they have conferred a boon on the region.

About 73 per cent of the total area is cultivable but only 48 per cent is actually cultivated, the largest percentage lying in the coastal plain region. About 42 per cent of the cultivated area is irrigated. Rice is the chief crop and occupies about 35 per cent of the total cultivated area. It is grown mostly on the flat lands of the eastern plain. Millet comes next and occupy the drier regions specially in the centre and west. Pulses, ground nuts and cotton also occupy respectable percentages. Cotton is important in Trichonopoly, Madura and Tinnevely where black cotton soil is the chief factor. Tobacco is important in Madura and Trichonopoly. *Beeris* and *cheeroots* are manufactured in these centres and are famous all over. Tea is grown on the slopes of the Nilgiri hills. In the matter of mineral wealth the region is poor. Some deposits of graphite and black lead occur in Tinnevely. Some mica is mined in Nellore. Much salt is obtained from sea-water on the coasts. Pearl fishing and fishing are important industries.

In the matter of density of population, the figures stand very high. It is much higher in the eastern plains. The region has very old migratory traditions. There are three main streams of emigration from this region. People migrate temporarily to the tea and rubber plantations in Coimbatore and Nilgiris. The second movement is to Burma and Ceylon and the third to Malaya. Emigration is heavy from the districts where irrigation facilities are low, the chief areas are Tanjore, Trichonopoly, and Tinnevely.

As in the Northern half there are no natural harbours in this region also, although some small ports do exist. (Pondicherry, Cuddalore and Tuticorin may be mentioned) Madras is the largest port of the province and even it does not have a natural harbour. As stated earlier, a new artificial harbour has been added to it. It is also the capital and the biggest town in the province. Madura is another important town. Otacamund, the summer capital may also be mentioned.

3. The Deccan plateau (including the Eastern Ghats) presents the roughest topography in the province. The average altitude ranges from 600 feet to 2000 feet. The surface presents an undulating outlook. The rivers flow through broad valleys. The region as a whole represents an arid piece of land getting below 30" of rainfall. Heaviest rain falls on the slopes of the Ghats.

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Now to have offer a brief general summary of the geography of the province, it seems useful to divide it into the following natural regions.

1. The Northern part of the East coast or the Northern Circars.
2. The Southern part of the east coast or the Carnatic Regions.
3. The Deccan plateau. 4. The West coast Region.

The Northern Circars cover an area of about 31,532 sq. miles and have a population of more than 12,000,000. The region occupies a low-lying strip of land stretching from the line of the sea to the foot of the eastern ghats. The fertile delta of the Kistna and Godavari fall within its boundaries. The soil is pre-eminently alluvial and the land presents a flat monotony.

The climate here is characterised by uniformly high temperatures and moist air. A unique feature is the fact that most of the rainfall occurs during winter months from the retreating monsoon. Thermometer never falls here below 75° F even in January. The average rainfall is about 40" annually. Both the monsoons contribute their quota but there are no spring rains.

Soils which are of the red type predominate in the region and as such irrigation becomes a necessity. The irrigation systems of the deltas are modern and also allow navigation in the main canals. In the deltas more than 80 percent of the lands is irrigated. But still there is great scope for an extension of irrigation.

The region has no towns of any great significance. It is poor in the matter of ports also. Agapatan and Coconada are the only ports worth the name. As we learnt earlier, Vizagapatam has a new artificial harbour. Vizianagram is an only inland town of any importance.

2. The Carnatic Region (or Tamil Region) occupies an area of about 23,200 sq. miles in the Southern part of the eastern coast of the Madras presidency. In 1941 the region had about 11,511,800 inhabitants. Going from West to East, the relief changes over from hills to plains and the region could be easily divided into an eastern plain (coastal) region and a western hilly region. Old hard crystalline rocks are found in the western half of the region while the eastern half is composed of young alluvium and has the best agricultural areas of the province. The hills have important mining industries.

Climatically this region is quite different from the rest of India as it receives most of its rainfall during October, November, and December from the North East Monsoon. During the season of South West Monsoon, the region lies in the rain-shadow of the Nilgiri and Andaman hills. The average rainfall is about 30 to 35 inches annually. In the eastern plains, therefore, irrigation is a dire necessity and canal irrigation is largely carried on there, the Perijer Project the Cauveri Delta system and the Point, Palor and Cheyyor systems deserve special mention as they have conferred a boon on the region.

About 73 per cent of the total area is cultivable but only 48 per cent is actually cultivated, the largest percentage lying in the coastal plain region. About 42 per cent of the cultivated area is irrigated. Rice is the chief crop and occupies about 35 per cent of the total cultivated area. It is grown mostly on the flat lands of the eastern plains. Millet comes next and occupy the drier regions specially in the centre and west. Pulses, ground nuts and cotton also occupy respectable percentages. Cotton is important in Trichonopoly, Madura and Tinnevelly where black cotton soil is the chief factor. Tobacco is important in Madura and Trichonopoly. *Beeris* and *cheeroots* are manufactured in these centres and are famous all over. Tea is grown on the slopes of the Nilgiri hills. In the matter of mineral wealth the region is poor. Some deposits of graphite and black lead occur in Tinnevelly. Some mica is mined in Nellore. Much salt is obtained from sea-water on the coasts. Pearl fishing and fishing are important industries.

In the matter of density of population, the figures stand very high-463. It is much higher in the eastern plains. The region has very old migratory traditions. There are three main streams of emigration from this region. People migrate temporarily to the tea and rubber plantations in Coimbatore and Nilgiris. The second movement is to Burma and Ceylon and the third to Malaya. Emigration is heavy from the districts where irrigation facilities are low, the chief areas are Tanjore, Trichonopoly, and Tinnevelly.

As in the Northern half there are no natural harbours in this region also, although some small ports do exist. (Pondicherry, Cuddalore and Tuticorin may be mentioned) Madras is the largest port of the province and even it does not have a natural harbour. As stated earlier, a new artificial harbour has been added to it. It is also the capital and the biggest town in the province. Madura is another important town. Otacamand, the summer capital may also be mentioned.

3. The Deccan plateau (including the Eastern Ghats) presents the roughest topography in the province. The average altitude ranges from 600-feet to 2000 feet. The surface presents an undulating outlook. The rivers flow through broad valleys. The region as a whole represents an arid piece of land getting below 30" of rainfall. Heaviest rain falls on the slopes of the Ghats.

Forests and waste land extend over a huge percentage of the area. Only a small percentage of the land is actually cultivated. Irrigation is carried on by means of reservoirs and tanks. (The Kurnool-Giddaps canal irrigates a valley between the Kistana and Pennar rivers.)

Millet is the main crop. Ragi and cotton are also cultivated. Rice and wheat occupy only small areas. The region presents good opportunities for mining industry and when greater facilities for proper production are introduced.

THE WEST COAST REGION Travancore and Cochin also form part of this region but they are described separately) is a continuation of a similar region described under Bombay. The plains lying west of the Ghats are much broader than their counterpart in the Bombay Presidency. It is also wetter and has a longer rainy season. A number of sand dunes occur on the coast which has a number of coconut trees. The slopes of the Western Ghats are covered by dense forests. Mangalore and Calicut are important towns of the region.

TRANVANCORE occupies a good portion of this region. It has an area of about 7,625 Sq. miles and a population of 3,070,720, the average density being very high 796 (more than 1000 in some parts.)

It lies at the southern end of the Indian Peninsula. About 250 sq. miles are covered with thick tropical jungle and 2,000 sq. miles more consists of hilly grass land. It contains a long strip of the fertile coast plain with many inter-connected water lagoons and a part of the Western Ghats.

The rainfall is very heavy in Travancore. The greatest quantity brought by the south-west monsoon falls between May and August. The average annual rainfall is over 100 inches. A dozen principal rivers, with their tributaries and ramifications, intersect the country in all directions.

The soil of the country varies from place to place. "Along the coast is fine whitish sand with a mixture of calcareous clay as a lower stratum, combined with vegetable matter; then the lower parts of the valleys consists generally of a brownish coloured clay, often porous and permeable and in some places, stiff and hard to work; the upper-lands repose on a basis of laterite which frequently appears superficially in large masses."*

Rice is the staple food crop. The area under oil-seeds, (which is nothing but coconut in Travancore) is appreciable.

Coconut, a staple food crop, which is also a good commercial crop, is intensely cultivated in Travancore. Special crops of importance in the State are tea and rubber. Coffee is a minor crop. "The combination of cash crops like paddy and tapica and money crops such as coconut and pepper, maintain an exceedingly dense population in Travancore."*

*Imperial Gazetteer.

*Food Planning for Four Hundred Millions, *Madraspec.*, 1977, p. 93.

Tea, rubber and cardamom plantations are flourishing concerns in Travancore. The growth of tea plantations in Travancore can be seen from the following figures.

1920-1924	48,655
1930-1934	73,729
1935-1936	77,585

In 1935-36, in Travancore 6,368 acres were under coffee. The manufacture of coir yarn is also an important industry in Travancore, inasmuch as, out of the 351,076 industrial workers 126,427 or 36 p. c. were employed in this industry in 1931. Out of the total export of Rs. 21.25 crores from the State, in 1930, coir yarn accounted for Rs. 2 crores roughly. In 1939, rubber plantations covered an area of 100,669 acres and the total production during the year was 23,353,760 lbs.

All the minerals in Travancore have not been explored. Plumbago is the only mineral worked to some extent. Mica of superior quality is found in various parts of the country. Graphite also occurs in the State. Vast quantities of Thorium have recently been proved in Travancore.

Travancore receives more immigrants than the immigrants it sends out.

The immigration is mainly to the tea, rubber and cardamom estates in the Highland Division of the State. Two reasons are given for this flow of outside immigrants. Firstly, the Tamil labourers are considered more efficient for plucking tea leaves, and secondly, the tea and cardamom estates of Travancore are inaccessible to the people of the State due to a lack of good communications. A new road has been recently opened which may solve this problem.

Trivendrum, the capital of Travancore, is a modern town with a university. It is also a railway centre. Allepy is an important port.

Cochin is another state much smaller in size than Travancore (only about 1480 square miles in area having a total population of about 1,422,000 persons).

It is situated north of Travancore and both of them are very much alike. Like other areas on the south coast of the Indian peninsula, the State enjoys the benefit of two monsoons, the South-West and the North-East. From the former it gets most of its rainfall. The average rainfall is over 100 inches. One of the most peculiar physical features of Cochin is the line of interconnected lagoons almost skirting the sea shore.

The soil may be divided into two distinct groups (i) The 'red' ferruginous derived from ferruginous atones, laterite and other rocks. (ii) The 'arenacious' being the flinty sand basis littoral

tracts—improved by manure and the silt of river. "The geological formation of the forest tract is gneiss, which is eminently fitted for luxuriant forest growth."

The chief harvests are (1) *Virppu* (September to October) (2) *Mundakkan* (December to January) carried on with a great deal of transplantation, (3) *Punchal* (March to April) and (4) *Ko'le* (April to June). The last named is peculiar to Cochin, Travancore and Malabar and means the cultivation of paddy in the fresh water lakes after draining away the water. A good *Ko'le* crop often saves the State from the effects of other bad harvests. Leaving the fields fallow is almost unknown, except in the case of *Ko'le* lands.*

The agricultural situation in Cochin can be studied from the following figures.

Agricultural Statistics

Percentage of Total Area

54.20

Percentage of
cultivated area

51.70

63.20

Cochin has good plantations of tea and rubber. The first rubber plantations were started in 1905 on the Pilapilli hills. The acreage under rubber has increased ever since. In 1931 there were seven rubber plantations with an aggregate area of about 10,000 acres. In 1939, 13,710 acres were under rubber and the total production during that year was 3,721,928 lbs.†

There are coffee plantations also. In 1862-1870 about 9,470 acres were leased out for coffee on the Neiliampathi hills. "Most of the coffee is exported, and owing to the want of transport facilities the acreage under cultivation has been decreasing and to-day there are about 6,000 acres under coffee". Tea is displacing coffee to a certain extent. In 1935-36 coffee occupied only 2,072 acres. The acreage under tea has increased greatly, it is now 2,591 acres.

Leather, cotton weaving, coir manufacture and ceramics also exist on a small scale in Cochin. Coconut oil-pressing, once a very flourishing concern in the State, is declining of recent years due to the competition from Ceylon.

Cochin is the capital and the most important port of the state. It was once an important coir port. It is steadily moving towards importance and economic development as an important port and city.

NORTH WEST FRONTIER PROVINCES.

In 1901, the N. W. F. P. was severed from the Punjab. It is 408 miles long and 279 miles broad and the total area amounts to about 39,276 square miles. It is about $\frac{1}{3}$ the size of England and Wales.

*Census Report, Cochin, 1906, p. xxxii.

†Indian Rubber Statistics, 1939.

Politically it consists of the 5 British districts namely Dera Ismail Khan, Hazara, Kohat, Peshawar and Bannu. Besides it consists of a Trans-Frontier Area containing five political agencies Malakand, Khyber, Kurram, North Waziristan and South Waziristan and also the Tribal Territory.

Geographically the province is a part of the Indo Natural Region, the North West Dry Region which stretches southwards beyond the Indus through the Punjab districts of Mianwali, Muzaffargarh and Dera Ghazi Khan and occupies a major portion of Western Punjab. Taken as a whole the province occupies a narrow higher mountainous tract. But one may divide it into 3 geographical regions i.e.

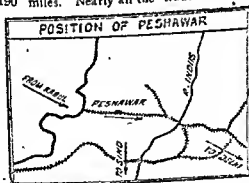
1. The Indus district of Hazara.

2. The narrow strip of plain containing the lowland districts of Peshawar, Mardan, Kohat Bannu and D. I. Khan, and (3) the bigger mountainous tracts of North and North-West and West.

The valley of Peshawar deserves special mention as it is best irrigated and best cultivated. The upper and lower Samat canals and the Kabul ring Canals are the chief irrigational works of the valley.

Wheat is the most important crop specially in the irrigated parts. Millets, barley and maize also occupy appreciable percentage. Hazara is specially important for millets.

Peshawar, the capital, is also the most important town of the province. It has been and is still important for its situation on the Khyber Pass. Its distance from Lahore is 276 miles and from Kabul it is 190 miles. Nearly all the trade between India and



Afghanistan passes through Peshawar. Most of its importance is due to its strategic position and since always it has been a very important military station. Bannu, Kohat and Dera Ismail Khan are also important military as well as trade centres of the province and control the affairs of their respective valleys or plains.

ORISSA

In separating Orissa from the combined province of Bihar and Orissa, the aim kept in view was to make it an area of linguistic units as it is to-day. Orissa is the name given to the whole country where the main language of the people is Oriya. The following areas having Oriya speaking people, have been combined to form the new province (From 1st April, 1936). Orissa division of the former province of Bihar and Orissa, (2) the Ganjam district of Madras. (3) Portions of Central provinces, Kharian, Raipur and Chandhapur. The new province has an area of about 32,000 square miles and a population of 11,754,000. Orissa is a backward province both in the matter of agriculture and industries, although its natural and mineral resources are not so bad.



Physically it is a heterogenous region as it has two district subdivisions (1) the plains comprising mainly of the valley of the Mahanadi and its tributaries and (2) the interior hilly region. The Northern portion of the coastal plain is unproductive. The central zone is a fertile alluvial plain having many deltaic formations. Towards the west land tends to rise.

The climate is free from extremes, the maximum and minimum temperatures being 82°F and 68°F respectively. The average rainfall ranges between 45 and 55 inches annually.

It is well watered by the Mahanadi, its tributaries and their canals. Cuttack district enjoys an extensive system of irrigation. Balasore and Puri having a smaller space, intervening between the hills and the coast, are for the most part, dependant solely on the rainfall. The south of Balasore has some irrigation.

Orissa is peculiarly liable to disastrous river-floods, which spread death and destruction. To control such calamities embankments to the rivers have been constructed. But sometimes these embankments prove mischievous, instead of useful. In their downward course the channels become gradually small capable of passing a small part of the water during floods. Hence escapes like safety-valves are necessary here. The constructed embankments by closing these safety-valves increase the danger of inundation.*

Agriculture is the main industry. The following figures are useful.

Agricultural Statistics

Year	Percentage of Total Area		Percentage of cultivable area		Percentage of cultivated area irrigated
	Cultivable	Cultivated	Cultivated	Double cropped	
1911	70.3	55.5	78.3	9.2	18.6
1921	73.2	53.8	73.5	6.5	19.4
1931	73.2	53.8	73.3	4.5	16.2

Rice is the chief crop and occupies about 80% of the total cultivated area. Other crops are jute, pulses and sugarcane.

Turmeric is extensively cultivated. Small industries like hand-loom industries, *endi* and *tussore*,* and silversmithy are very common, which have reached a high degree of skill and efficiency. The chief mineral products are iron, limestone, manganese and mica; 60% of India's iron ore come from Mayurbhanj, Bonai, and Keonjar, Feudatory States of Orissa. Coal-mines are found in Amkul, Sambalpur, Gangpur, Talcher, and Athmalik. The number of factories in 1937-38 was 72 with 34,802 hands including seasonal workers. Chilka and Puri export 9,000 mds. of cured fish and 50,400 mds. of fresh fish to Calcutta every year-fishing being an important industry in Orissa. A large area is covered with forests producing a considerable quantity of timber. Hides and skins form another minor industry. In 1937-38 the province had 1,458 miles of roads, of which about a thousand miles were metalled. The total mileage of railway in the province is only a little over 500 miles. The construction of Vizagapatam harbour has given a stimulus to the foreign trade of the province. The people are mostly rural and majority of them are Hindus. The number of towns is small.

Cuttack is the old capital and near it a new sight has been selected for the construction of the new capital. It is situated on the delta of the Mahanadi and is an important trading centre famous for its gold, silver and ivory industries. Puri is another important town and port. It is also a place of pilgrimage for the Hindus. Fishing is an important industry.

*W. A. Inglis. "River Floods considered as a Problem of Indian Administration." The Asiatic Review, October 1926.

THE PUNJAB*

The Punjab or the land of five rivers may rightly be called the gift of canal irrigation, because not very long ago, before the construction of the most magnificent canal system in the world, this area drained by the five great rivers (Sutlej, Beas, Ravi, Chenab and Jhelum) presented quite a dreary outlook and had a very thin population owing to an acute lack of rainfall just like portions of Sindh, N. W. F. P. and Rajputana. To-day, however, things have totally changed and our province supplies food grains not only to deficit areas within India but also outside. We have already learnt about irrigational and agricultural details regarding this province, here, therefore, it may only suffice to reproduce them in a brief style.

Lying between the Indus and the Jumna and bordered by Rajputana in the south, the Punjab occupies a vast stretch of alluvial plains measuring about 100,000 square miles exclusive of the many native states which not long ago were under its political control—the most important being Patiala (area 5,932 sq miles and population 1,636,259, Jind area 1,292, s.m. population 3,61,812, Bahawalpur area 6,050 square miles population 3,35,797). The North-eastern portion includes portions of the Himalayan and sub-Himalayan regions. While the North-West is a dry plateau, which is really a continuation of the North-West Dry Hills Region, the Punjab plains contain alluvium of unplumbed depth. The middle Himalayas consist of crystalline rocks and much metamorphosed strata. The Himalayas are of comparatively recent geological age and they are still being uplifted. There are two main classes of soils in the province the sedentary soils of the hills and the alluvial soils of the plains. The hill soils are not very deep, their depth varying from a few inches on exposed slopes to several feet where forests are preserved. The alluvial soil in the plains is thousands of feet deep and is very fertile.

Like the rest of the country, Punjab has three seasons—(Winter, Summer and Rainy). The temperature conditions as a whole present extreme, continental outlook owing to the absence of any tempering influence of the sea. During the summer season, the temperature may rise as high as 120°F while in December and January it comes down very low. The mountains present, quite temperate conditions in summer and rather very cold conditions in winter with snow as a common feature. Rainfall is dominated by the South-West monsoon but owing to topographical reasons, the province gets little rainfall during

*We are thankful to our publishers for letting us make use of the material regarding Punjab collected by Akhtar and others for their book "Essentials of Economics".

this season, although it gets the advantage of both the Arabian Sea Branch and the Bay of Bengal Branches of monsoon. In the winters rainfall comes from the North-West. This is due to cold weather disturbances, but their force decreases as they reach the Gangetic valley. These depressions advance from the West, coming over Iran and Afghanistan into N. W. India. Their exact origin disputed. Some have close association with the Mediterranean Sea, other are probably secondaries, and are associated with the same types of weather. The rainfall on the hill slopes (places like Dharamsala and Dalhousie) get quite heavy rainfall above 80" and are covered by forest—having oak and *Deodar*. On the other hand there are places in south and west where rainfall is over below 10".

It is therefore evident that in a very large part of the area, irrigation is an absolute necessity, without which agriculture becomes uncertain and poor. A detailed account of the important canal systems has already been given in the chapter on irrigation. Hence it is only necessary to give a brief outline. About 165 million acres of land are under canal irrigation. There are more than 2810 miles of Government canals and about 15,000 miles of distributaries. The largest irrigation works are :—

- (1) The Sutlej valley canals irrigating about 1.5 million acres
 - (2) The Lower Chenab canal irrigating about 2.3 million acres
 - (3) The Upper Bari Doab canal irrigating about 1.2 million acres
 - (4) The Sirhind canal irrigating about 1.79 million acres
 - (5) The Western Jumna canal irrigating about 0.8 million acres
 - (6) The Haveli Project irrigating about 7.0 lakh acres.
- Besides there are about 3,32,182 wells irrigating about 43,46,200 acres.

Taking the Punjab as a whole, the land utilization figures* are :—

Total Area	-	61,001.6	thousands of acres.
Cultivable	-	30,992.6	" " "
Waste	-	37,186.8	" " "
Forests	-	1,975.2	" " "

About 33 percent of the cultivated area is under wheat. Cotton is the most important summer crop. The following table gives crop acreages for the province.

Rice	...	...	951,181
Wheat	...	...	9,884,302
Barley	...	...	799,299
Jowar	...	...	876,338
Bajra	...	...	3,882,825
Maize	...	...	1,144,402
Grain	...	...	3,450,144
Oil seeds	...	...	1,481,456
Sugar	...	...	549,173
Cotton	...	...	2,668,814
Fibres	...	...	2,717,437
Tobacco	...	...	60,599
Fodder	...	...	5,215,941

*Mention must be made of the admirable articles on the Punjab by Dr. Kazi Naeed uddin-Ahmad, published from time to time.

Wheat. Wheat is an important crop not only because of the export trade but also because it is the staple food of a large part of the population. But the quantity of wheat exported is only that which is in excess of the requirements of the population. The yield varies in different localities, being 5 to 10 maunds in unirrigated lands and 5 to 25 maunds per acre in irrigated lands. Harvesting time for wheat begins in April and sowing is done in October and November. Wheat is grown all over the province in considerable quantities except the Ambala Division and the Ferozepur District. The Districts of Lyallpur, Gurdaspur, Montgomery, Jullundur and Multan deserve special mention.

Barley. Among winter crops barley comes next to wheat. This is a food grain grown on soils which are inferior in composition and moisture. This is a coarser grain which is more hardy than wheat. This is grown mostly in Hissar, Gurgson and Ferozepur Districts. The important use made of barley is for brewing and malting.

Gram. It is a winter crop and holds a prominent position among the pulses. It is cultivated in unirrigated lands and therefore is dependant on rainfall. It is cultivated in considerable quantities in the districts of Ferozepore, Hissar and Ludhiana.

Rice. This is a summer crop requiring special conditions for its cultivation. It can be grown in hot climate with plenty of water supply and moisture. The sub-montane districts of the Punjab are specially favourable for its growth. The districts of Hoshiarpur, Kangra, Simla and Gurdaspur are among the important producers.

Cotton. This is an important commercial crop which occupies a prominent position in export trade. The variety of cotton grown was mostly short staple (Desi) but in recent years long staple (American) variety has become more popular because of the high value that it fetches. Cultivation of cotton is possible only in irrigated lands.

Cotton requires hot moist climate for sowing, moderate rainfall during summer months and dry autumn at the time of picking. It is grown in large quantities in the canal colony districts of Shahpur, Montgomery, Multan, Lyallpur and Sheikhupura.

Sugar-cane. This is a crop the possibilities of which were not properly appreciated till recently. India used to depend on imported supplies of sugar. Plenty of water supply is necessary for its growth.

Its cultivation demands a good deal of the time and attention of the cultivator. However, its value adequately compensates him for the trouble involved. Among the sugar growing provinces, Punjab stands second to U. P.

Sugar-cane is sown in March and harvested in the winter months of January and February. It flourishes in hot climate having sufficient

moisture. The districts of Hoshiarpur, Jullundur, Amritsar, Gujranwala and Lyallpur have proved particularly suitable for its production.

Most of the sugar-cane is now used in the manufacture of sugar by sugar factories which have been established in different parts of the province. Before this *gur* was made out of the sugar-cane juice.

Jawar and Bajra. These are grown in drier parts and are used both as human and animal food. Grown practically in all parts in limited quantities, they are consumed locally.

Oil seeds. They form another important crop. We export oil seeds in large quantities; important oil seeds being linseed, til, castor-seed, rape-seed, etc.

Oil got out of these seeds apart from being edible is used for burning purposes. A good deal of it is now being used for the manufacture of vegetable ghee also. Oil cakes are a valuable food for the cattle. These are grown almost all over the Province.

Tea. This is grown in the Kangra valley at the foot of the hills. It requires warm and damp climate with abundant rainfall which should be drained off. The quality of the tea grown is not as good as that grown in other parts of India.

Maize. This is a food-crop which is used as a staple in some parts. As it requires plenty of moisture and heat, it flourishes in hilly tracts at low altitudes.

Vegetables. Vegetables such as carrots, turnips and potatoes are now grown extensively, particularly near the centres of population.

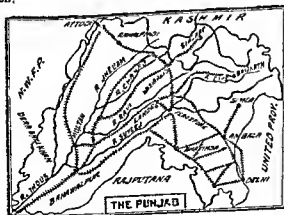


Fig. 73.

Potato is a very profitable crop which has come to the forefront in recent years.

Fruit Industry.* About 76,000 acres are devoted to fruit cultivation in the whole province; this shows an increase of about 30,000 acres during the last 15 to 20 years. This rapid expansion is due largely to the opening of a number of fruit factories in the various towns. The Punjab produces the largest quantity of fruit in India, having a close second in U. P. At present only mangoes are exported. The province may be divided into the following fruit zones.

(a) The cool climate region (Kangra, Simla, Kullu and Murree) has mild summers and severe winters. Pears, peaches, apples and apricots thrive here. In higher regions there are gardens of litchis and strawberries.

(b) The dry Salt Range region with its extreme climate is important for hardy fruit like almond and plums.

(c) The Punjab Plains are rather dry but have good irrigational facilities. With greater extremes of climate in the west and south-west, tropical and sub-tropical fruits like grapes, mangoes, cherries, dates and lokats thrive.

After a general survey of agriculture in the province it seems useful to divide the Punjab into agricultural regions. Dr. Saeeduddin† Ahmad who has made a detailed study of the agriculture of the province, is the first to sponsor such a division from a geographical point of view. And we have followed his divisions here.

He divides it into seven regions;—

1. North-East Region.
2. North-West Patwar plain.
3. North-East sub-montaine Region.
4. East central plains.
5. West central plains (Colony Region)
6. South-East Plain.
7. Western Plains.

1. The North-East Region consists of the districts of Kangra and Simla and a narrow hilly strip of Ambala, Hoshiarpur and Gurdaspur. The rainfall is reliable and abundant, about 45.9', variability being less than 12%. Terracing and preparing the land for cultivation is rather expensive. Hence sheep rearing is a more commonly followed occupation. Agricultural holdings, specially in

* Fruit Industry in the Punjab by Farhat Ullah Khan, The Punjab Geographical Review-Vol I 1942 is a good contribution and has been used.

† Agricultural regions of the Punjab-Kazi S. Ahmad, The Punjab Geographical Review, Vol. I, 1942.

Kangra and Simla, are smallest in the province (2.5 acres). Wheat, maize, rice and pulses and barley are the chief crops. Kangra grows all the tea in the Punjab. Fruit growing offers another possibility. Not many people live in this region and settlement is characterised by isolated cottages and scattered hamlets.

2. The North-West Pnwar Plain lies north of the salt range and includes the districts of Rawalpindi, Attock and Jhelum. The plateau is an undulating country broken by hills and consists of woodlands bearing traces of former glaciation. The soil is light loam. The loam here is shallow and the summer crops are liable to be burnt up. Rainfall varies from 21" in Attock and Jhelum to 31" in Rawalpindi, the winter and spring precipitation being heavier. Irrigational facilities are at the very lowest. Holdings are fairly large, being 5 acres to 10 acres. Wheat and bajra occupy 60 per cent of the cultivated area. Other crops include pulses, maize and gram. Vegetables are also produced.

3. The North-East Sub-montane Region includes Ambala, Hoshiarpur, Gurdaspur and also the districts of Sialkot, Jullundur, Ludhiana and a part of Gujrat. The region stretches in a long strip along the Himalayas. The rainfall is high as well as quite reliable. As a rule the rainfall decreases towards the north-west and south-west. The sub-soil water level being high it is easy to dig wells. Wheat, maize, sugarcane and fodder occupy about 7% of the cultivated area. The population is the densest in the Punjab and the holdings are correspondingly smaller (2.5 acres)

During the monsoon months the climate becomes unhealthy and damp. Rajputs are the predominant tribe. In parts of Ambala and Hoshiarpur much fertile soil has been lost because of erosion.

4. The East Central Plain. This plain consists of old settled districts from Jamna to Jhelum including Karnal, Ferozepore, Lahore, Amritsar, Sheikhupura, Gujranwala and a portion of Gujrat. This region also is very thickly populated. There is a great pressure on the soil and the holdings are unusually small though as a rule larger than in North-East submarine region. Both canal and well irrigation are developed and mitigate largely the effects of low rainfall. The rainfall besides being low is also very variable. Wheat is the principal rabi crop and cotton forms an important kharif crop. Some rice is grown in the western portion while gram is grown in the eastern portion. Vegetable gardening is on the increase near the towns. There is an elaborate network of railways and roads and the area has within it two important mandis of Lahore and Amritsar.

In this area we come across a well organised village community and the land is held by small land-holders because since the days of the Moghals big zamindars and Taluqadars have not been allowed to flourish.

5. The colony region or W.C. Plain. This is agriculturally the most progressive area of the province and consists of Montgomery, Lyallpur and a major portion of Jhang. Here agriculture has taken definite shape of agriculture farming. Until about forty years ago this region was almost valueless agriculturally owing to a lack of rainfall. Situated between large rivers the area has now been irrigated by canals most of which are permanent. A large number of wells supplement the canal water where necessary. The former Government waste lands have been colonized by actual agriculturists who have migrated from more crowded areas. They have been settled on rectangles of land varying from 25-27 acres of area and carefully planned villages have been built. The holdings are large and compact which lead to great efficiency in agriculture. Improved machinery is in use. Leading crops are wheat, American cotton and fodder. There is a considerable surplus for export. The region is well supplied with markets which are connected with villages by roads and railways. The region as a whole presents a prosperous, well developed and illuminated agricultural community.

6. The S. E. Plain. It is situated between the Jambua and the Sutlej and comprises the districts of Rohtak, Gurgaon and Hissar. This region is largely devoted to dry farming. Only a small portion of this region is irrigated. Canals and wells are difficult to construct owing to the water table. The main problem of the area is to provide hardy crops and hardy varieties of popular crops. Special attention is paid to cattle breeding and the region is well noted for its excellent breeds of cattle. Bajra and fodder in summer and gram along with coarser varieties of wheat are the principal crops of the region. Barley is grown largely in the district of Gurgaon. The region is not densely populated and the holdings are as a result large—the average being 7.5 to 10 acres. In more fortunate years there is usually a large surplus of grain but unfortunately such years are once in five years. There is always a danger of famine and life is a constant struggle with nature. On the east the region is akin to U. P. and in the south to Rajputana. In the north one comes across wide-spread sand dunes and a large number of camels are employed both in the fields and on the roads.

(7) Western Plains. This region comprises of the districts of Mianwali, parts of Shahpur, Jhang, Muzaffar Garh and Dera Gahzi Khan. It is the poorest and the most backward region of the province. Here the people live in the old pastoral state and still retain their nomadic habits. One comes across tribes under Pirs and religious groups. The relief of the region is rather trying. Soil is sandy and infertile. In summer it is one of the hottest regions of the north and the rainfall is very scanty and unreliable. (below 10", variability 50. % to 60 %). The land is divided amongst big landlords who are

extravagant except in the matter of their fields. One comes across the extremes in the matter of the size of the holdings. The small holdings are too small to support its holders. The region is as a whole very thinly populated but compared with the poverty of the land the population is much more than can be supported.

Agriculture is very precarious and is confined to the places near the rivers or near the inundation canals. There are also tiny patches of cultivation near the wells. These wells* are also poor in the supply of water especially when they get away from the rivers. Wheat and gram are grown in winter, Jawar and Bajra in summer. Large quantities of dates are produced. In a large part of the area many people live on dates for many months and at many places the date stones are ground into flour. An important characteristic of the region is that on account of poor yields subsidiary means of livelihood are important. Cattle and horse breeding are quite paying occupations. Pastoral farming is also followed by nearly all the farmers. Villages are few and far between and the means of communication are backward. Very few railways cross the Indus to the west and metalled roads are also rare. Only kucha roads and tracks connect the various villages.

FORESTS :—

The area under forests was 6·7 per cent. of the total areas of the Province in 1937-38. These are mostly to be found in the hilly tracts. Due to the lack of means of transport full economic benefit can not be derived from them. With the extension of railways and roads a greater exploitation of the commercial possibilities of the forests is bound to come. At the present extraction from forests usually takes the form of floating timber down the rivers from the hills to the plains. It is in this way that the well known timber markets at Lahore, Wazirabad, Jhelum and Jagadhri have sprung up.

Variations in the climatic conditions, the quantity of rainfall and altitude, give rise to the different types of forests. As the province is situated far away from the sea, it is not within an easy reach of the monsoons; the annual rainfall in the central districts is about 20 inches. In the south western districts the rainfall is even less and seldom exceeds 10 inches. The climate is extremely hot in summer and very cold in winter. Thus in districts such as Ferozepore where rainfall is scanty only such trees are to be found as can retain moisture, e. g., Kekar, Jand and other prickly shrubs, which form very valuable fuel. The northern plains, even though better off in respect of rainfall, are without forests as these have had to be cleared up under the pressure of population.

On the southern slopes of the Himalayas where rainfall is plenty and altitude higher, we have the thick forest lands around

* A five-year scheme costing about two crore rupees, of sinking wells in the province is under consideration of the Government.

Simla, Kangra, Kulu and Hoshiarpur. Then there are the north-western hills around Rawalpindi and Jhelum with comparatively low altitude and smaller rainfalls where the vegetation is less luxuriant :—

The forests of the Punjab may be classified under two heads :—

(a) Hill forests, and (b) forests in the Plains.

The former type are found in the hilly areas and the latter in the sub-montaine tracts and along the banks of rivers and canals. The hill forests supply valuable wood used for construction purposes and as fuel, e.g. fir, pine and walnut. The forests in the plains are the suppliers of shisham and mulberry wood which is used for the manufacture of furniture and sports goods.

The development of irrigation facilities has led to the coming into existence of rich forest plantations e.g., the one at Changa Manga, 40 miles away from Lahore; the other at Chichawatni, in the Montgomery district, and the third at Khanewal, in the Multan District. The mulberry trees grown in the Changa Manga plantation supply raw materials for the flourishing sports industry at Sialkot.

There are also two other smaller plantations, one at Kot Lakhpat and the other at Hoshiarpur, not very far from Lahore.

Apart from the ordinary uses of forests such as the supplying of timber and fuel wood and providing grazing grounds for the cattle, the Punjab forests have a great indirect value in so far as they provide raw material for some of the important industries. The sports goods industry at Sialkot which uses mulberry wood has been referred to elsewhere. In addition there are other industries which deserve mention; match manufacturing industry at Shahdara and the furniture industry at Kartarpur and Gujrat which make use of shisham wood in large quantities; the resin industry at Jallo which gets its raw materials from pine trees and makes useful articles like boot polish, varnishes; the paper industry at Jagadhri gets its pulp from the forests. All these industries would not have come into being without the existence of forests.

Water-Power in the Punjab—In a province like the Punjab, where hardly any coal is obtainable, the importance of alternative sources of power cannot be exaggerated. Fortunately, the province is favourably situated regarding the development of water power, because it has a large number of streams and rivulets in the hills which keep flowing throughout the year. Already there is a Hydro-Electric Scheme in operation at Jogindar Nagar in the Mandi State. The water of the Uhl river has been utilised for producing power by diverting it through a tunnel, about two miles long, and then dropping it down about 1800 feet below by means of steel pipes.

This started working in March, 1933, and is supplying electric current to a number of important towns in the province. The scheme has only been completed in part. When it reaches its full development it should be able to supply cheap and adequate power not only for domestic purposes but also for the development of industries and agriculture.

Mineral Resources of the Punjab. The province is not very favourably situated as regards its mineral resources. The following minerals are found in limited quantities mostly in the hilly tracts.

Coal. It is had at several places in the province. The largest output, however, comes from the Salt Range at Dandot (Jhelum district) where mines have been worked for the North-Western Railway. The Dandot mines have a fluctuating output which comes to about 50,000 tons annually. Other places of minor importance are Bhaganwala and Tejawala in the Shahpur District and Makarwal in the Mianwali District. The total quantity produced is by no means sufficient to meet the requirements of the province and large quantities have to be imported from Bengal.

Iron. Iron is found in very small quantities in the Kangra District, at Chabrat in the Attock District and in some of the Hill States. These mines cannot be worked profitably on account of coal not being available in the vicinity of the mines. The quantity actually obtained, therefore, remains negligible.

Salt. This is an important mineral of the province. Most of it is obtained from the Salt Range at Kewra and Kala Bagh. Some salt is also obtained from the brackish water at Farrakhabad in Gurgaon District. A small quantity is obtained from open quarries in the Mandi State.

Petroleum. This is found in considerable quantities at Khaur and Dhulian in the Attock District. The supply, however, is not enough for the requirements of the province and it depends on imported supplies. The oil obtained from the wells at Khore is carried through a pipe-line to Rawalpindi where a refinery has been set up.

Gold. This is obtained in very nominal quantities from the gravel of the Indus and some other rivers by means of washing—alluvial gold.

Slate. Good quality slate is obtainable from Kangra Valley near Dharamsala and at Rewari in the Gurgaon District. The use of the slates in the province, however, is not made on extensive scale, because of the difficulties of transport and the availability of cheap cement tiles almost everywhere.

Salt petre. This is produced in different parts of the province and is used in the manufacture of gun powder. Important centres of its production are Okara (Montgomery) and Bhera (Shahpur).

Limestone, Cement, etc. Lime for making mortar is obtained by burning limestone. This is used as a binding material. Large deposits of limestone are found in the North-Western districts of the province. The impure limestone, known as "Kankar" forms a raw material for the manufacture of cement. We have a big cement factory at Wab in the Attock District.

Clays. The well-known place in the province for a special kind of clay known as "Multani Matti" is the Multan District. Multani Matti which is edible is also used for medicinal purposes.

Alum. It is manufactured in the Mianwali District and the output ranges from 200 to 300 tons per year.

Industries of the Punjab. We may now give a brief description of the principal large-scale industries existing in the Punjab.

Textile Industry. "Of the principal manufacturing industries now existing in the Punjab the cotton industry is the largest." It employs the largest number of workers and produces goods of maximum value. Cotton textile mills are established at Ludhiana, Lahore, Amritsar, Montgomery, Okara and Lyallpur. Their total production amounts to about 33 million yards annually.

The Punjab is the largest producer of cotton but her industry consumes only 12½ per cent. of the total production. There is therefore considerable scope for the expansion of this industry.

Cotton Ginning and Pressing. Factories for cotton ginning and pressing are established in the cotton-growing tracts of the province and therefore they are found at Amritsar, Lahore, Lyallpur, Okara, Montgomery, Sangla, Sargodha, Khanawal, Moga, and Ludhiana. The number of such mills will automatically increase with the expansion of cotton growing.

Woollen Goods. The Punjab produces the largest quantities of raw wool and exports about 11 million pounds to other provinces and foreign countries. The quality is rather inferior and, therefore, better quality wool has to be imported. There is a considerable scope for improving the quality and for the expansion of the industry centred especially now that foreign supplies of woollen goods have been. We are the largest consumer of woollen goods and thus the market is already there. It is, therefore, time that the Dhariwal Woollen Mills should have more rivals in the field. A suggestion has already been made for establishing a Government factory at Fazilka or Amritsar, both of which are wool centres of the Province.

Hosiery. This industry is of recent origin and is making a satisfactory progress. It has a bright future and large scope for development because of the abundance of raw materials and market for the consumption of its products. At present it is exclusively confined to Ludhiana, though factories at other places, e.g., Amritsar, Lahore, etc., are being established.

Sugar Industry. Several sugar manufacturing factories of the modern type have been set up within the province at various places e.g., Abdullapur in Ambala District, Phagwara in Kapurthala State, Sonapat, Amritsar, Gujranwala, etc. But for the Central Government's policy, the industry would have made considerable progress during these years, because raw materials can be easily produced in the Province.

Resin and Turpentine. The manufacture of these articles is carried on mainly at Jallo, where a Government factory has been established for this purpose. This industry could also be expanded.

Cement Industry. With the economic development of the Province this industry is likely to make rapid progress. At present it is at Wab (Attock district) that the biggest factory is situated. Another factory has been recently established at Dandot (Jhelum district).

Cottage Industries form an important part of our economic life. Certain areas have come to be associated with certain articles. The following cottage industries are to be found in different parts of the Province :—

(a) Handloom weaving. (b) Carpet weaving. (c) Hosiery. (d) Iron and metal works. (e) Cutlery and surgical instruments. (f) Pottery. (g) Sports. (h) Ivory goods. (i) Tanning. (j) Wood-work.

Handloom weaving is an industry of long-standing, which at one time was in a flourishing state. But the competition with the machine-made goods exposed it to a serious danger. The industry would have died out completely if it had not adapted itself to the changed conditions by making use of imported yarn. The industry is widely distributed over different parts of the Province and different areas have come to specialise in the production of different articles. For example, Rohtak specialises in the manufacture of turbans. The districts of Multan, Montgomery, and Jhang are well-known for the bed-spreads (Khes). *Durries* are associated with the districts of Ambala and Lahore. Gujrat, Ludhiana and Hoshiarpur turn out dress material made from artificial silk in larger quantities.

Shawls of fine quality are made out of wool at Amritsar, Ludhiana and Gujrat, wool being imported from Kulu and Kashmir.

Silk material is manufactured at Amritsar, Jullundur and Batala. The yarn used is partly of home origin and partly imported. Silk manufactures of these areas command a wide market all over India and enjoy a high reputation for quality and design.

Carpets. Woollen carpets are manufactured at Multan and Amritsar. On account of the establishment of big factories at

saddles, etc. But with the coming in of modern methods, it is losing its importance. Wazirabad, Sialkot, Mianwali and Attock are still doing a certain amount of tanning.

Wood-work. This industry may be split up under two heads: Firstly, the manufacture of furniture for which important centres are Gujrat and Kartarpur (Jullundur district). They produce cheap furniture made from Shisham wood, which is sent out to different parts of the Province.

Secondly, we have the wooden toys and other small articles like jewellery boxes, lamp stands, vases, etc., being made out of wood and printed in artistic designs. Well-known centres for this are Hoshiarpur, Pakpattan (Montgomery), and Sahiwal (Shahpur).

Miscellaneous. Other minor industries are chick making, basket-making, rope-making, etc., found practically in all parts of the Province. Soap making at Amritsar and Sargodha, chalkpencils and crayons at Gujranwala, and hand-made paper at Sialkot also deserve mention.

Population. The total population of the province is 34,309,861 out of which a major portion i.e., 29,269,030 live in villages whose number is 52,647 and only 5,040,711 live in urban centres whose number is only 283. The 1941 figures show an increase of 5 million over 1931 figures, a fact of that points towards settled conditions and progressive development of agriculture in the province. In the canal colonies, the increase in population during the last fifty years has been tremendous*. The reasons are quite obvious. A study of density figures for the various regions of the Punjab shows that it ranges from the very lowest (54 in Chamba) to the very highest 699 in Amritsar). The density is mainly determined by conditions favourable to growth of agricultural crops. Presence of industries and markets as in Amritsar, Lahore and Ludhiana also tend to affect the figures.

The Punjab is a Muslim majority Province with 16,217,742 Muslims. Figures for others are below:

Hindus (excluding scheduled caste).....	6,301,737.
Scheduled caste	1,592,320.
Sikhs	5,116,185.

Canal Colonies. Settlement in the canal colonies is quite a recent affair and as already mentioned the population in these districts has gone up tremendously only during the last half a century. All this has been possible only by the development of irrigation specially canal facilities in the formerly barren lands, rainfall here being very low.

* Attock—Lyallpur—Multan—Jhang—Shahpur.

1881	301,312	53,832	555,516	190,633	381,632.
1941	1,329,105	1,329,465	1,434,333	821,631	598,921.

Amritsar the cottage industry has fallen into insignificance. Amritsar carpets are exported to foreign countries, particularly to U. S. A., in large numbers.

Hosiery In recent years hosiery has come to occupy an important position. This is due to the growing demand for its products like socks, stockings, pull overs, underwears, etc. The use of cheap and simple machinery imported from Japan is a special feature of this industry. Important centres are Ludhiana, Lahore and Amritsar.

Iron and metal works. Although the Province has to get its raw-materials from distant parts, the industry has established itself in different centres; Jullundur and Batala have become well known for the manufacture of agricultural equipment like sugar-cane crushers, fodder chopping machines, ploughs, etc. Sialkot, Jullundur and Amritsar are manufacturing iron and steel boxes in considerable quantities.

Copper and brass ware in the form of household utensils are made at Gujranwala, Jagadhari, Amritsar and Jullundur.

The manufacture of cutlery and surgical instruments has also been taken up in recent times. The industry has been gaining ground on account of the installation of chromium plating plant. Important centres are Sialkot, Wazirabad, Bhera and Lahore.

Pottery. Earthenware are widely used by the poor people. Every village has a potter to supply its requirements. But the Districts of Multan and Gujrat have come to specialise in the production of glazed earthenware of artistic finish. This industry is not doing well now because of the cheap glass and China wares having become available.

In this connection mention may also be made of the cement tiles which are being manufactured in important centres like Lahore, Amritsar, Rawalpindi, Pathankot etc., on account of the increasing use being made of these for flooring purposes.

Sports goods. This is an industry which has dug its roots deep in Sialkot. The labour having become skilled and specialised has given the industry a peculiar advantage. Sports goods made in the Punjab not only supply the market all over India but also in a number of foreign countries. The industry is in a flourishing state and has been able to hold its own against foreign competition.

Ivory goods. Multan, Bhera and Amritsar are the important centres. Articles manufactured are combs, beads, buttons, toys, etc. Internal demand for these articles is very small. They are bought mostly by the rich people or by the foreigners.

Tanning. A certain amount of tanning in the old and primitive manner has always been done for the manufacture of country shoes,

saddles, etc. But with the coming in of modern methods, it is losing its importance. Wazirabad, Sialkot, Mianwali and Attock are still doing a certain amount of tanning.

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* Montgomery—Lyallpur—Amritsar—Jhang—Shahpur.

1881 306,312 51,812 235,516 190,633 383,632.

1911 1,329,165 1,329,165 1,434,333 821,631 550,921.

Settlement has taken place in S. W. Punjab in the interlying tracts between the Punjab rivers :— 1. The lower and upper Jhelum colonies lie in the Chaj or the Chamba Doab between the Chenab and Jhelum corresponding to the district of Shahpur, and the portions of Jhang and Gujrat, 2. Lower and upper Chanab colonies in the Rachna Doab between the Ravi and Chenab comprising districts of Lyallpur, Jhang, Sheikhupura, and Gujranwala 3. the Lower Bari Doab and the Nili Bar colonies in the Bari Doab between the Ravi and the Sutlej corresponding to the districts of the Montgomery and Multan. The colonies cover an area of 5.5 millions acres.

Most of the people who live here now came originally from the eastern parts which were overpopulated and from the northern and north-western parts which were unproductive. Here colonization has been a rather gradual process, running parallel to the history of the four canal systems. 1. The Lyallpur colony or the lower Chenab colony covers an area of about 3,093 sq. miles and its development is associated with the construction of the lower Chenab canal (1892—1896).

2. The Shahpur colony also known as the lower Jhelum colony, is associated with the lower Jhelum canal (1916—21).

3. With the Triple canal Project are associated the upper Chenab colony (1915—19) and the upper Jhelum colony (1916—21).

4. The latest of the colonies named the Nilihar colony is associated with the Sutlej Valley Project. It covers the southern portions of Multan and Montgomery.

Besides the main colonies named above, there are also a few minor colonies (a) Sohagpur and Sidnae, (b) Jhang, (c) Haveli (1938).

In the colonization of *bars**, two aims were in view; (a) to relieve the pressure of population in the highly congested districts of the north and the centre of the Punjab (b) to create villages of better design and plan; (c) the South African war had brought about the need of a regular supply of horses and mules and camels and it was consequently proposed to give land to those who would maintain mares and camels for breeding purposes as in the case of Shahpur and Montgomery colonies. But at present this policy is being discontinued and the land is being turned into peasant grant and people are also encouraged to have vegetable and fruit gardens.

In the lower Bari Doab colony some land has been selected for the settlement of the criminal tribes and for depressed classes.

*Bar means a barren waste. The Punjab has many bars; Sandal Bar (south Rechna); Kirana Bar (south Chaj Doab); Nilihar; Gaoji Bar (in Montgomery district).

The colonists fall into three categories (i) the small peasant proprietor, who is given about a square of land (except in Shahpur and Montgomery where an additional square is given to maintain mares and camels for breeding) (ii) the middle class farmer (Yeoman farmer) was given from 4 to 5 squares of land; (iii) the land lord who got from 6-20 squares.

Process of Settlement. Before the construction of a canal the tract to be colonied was divided up into large squares and rectangles. The shape and size of the sub-divisions varied from place to place. A square or rectangle was the usual unit of allotment and each such unit was further divided into acre, squares or rectangles known as Killa. In the Triple canal colony nearly 4 million such small rectangles and squares have been demarcated. The next step was soil survey to eliminate the worthless soil from the point of view of irrigation.

By this system every colonist got his land in one compact block, and the other advantage is that the holding can be further divided equally and cheaply after the death of the father.

After the completion of the squares the next step was to mark the boundaries of estates which were to be formed. The idea was to make boundaries of each group of allotments to coincide with the boundaries of the area commanded by the watercourse which irrigates it. As a rule two or three chaks were to constitute a village. The size of these chaks varies widely but there has been a tendency to decrease the size of the villages to 1,800 acres or even less. No two villages ordinary get irrigation from the same source. After the settling of the village was determined, the main streets were demarcated and some land was set aside in the vicinity for grazing and for the accommodation of the manuring heaps. Proper attention was paid to sanitary arrangements also.

Houses—In the earlier stages there was no fixed plan and anything which could be called a house was allowed to be built. It was first in the Nali Bar colony and other more recent colonies that regulations were made out for the general layout and sanitation of the houses. The chief points are :—

- (1) A minimum height of 12 feet for living rooms.
- (2) No hack to hack houses.
- (3) Provision of good windows, a separate kitchen and separate godowns and cattle sheds.
- (4) A verandah and a good court yard.

The houses are generally of mud and sunbaked bricks. The roof consists of wood covered with impervious mud. Occasionally the roofs are thatched. The clay has to be renewed every year before the rainy season sets in. The houses are mostly one storeyed.

The ordinary position of the village well is the central chowk. When ever there is an old well near the village no new well is constructed. Tanks for washing are also provided at easy distances. Near about the younger colonies small recreation grounds have been provided which are used for ventilation and exercise. Near about the ground we have school play ground, and brick kilns. Tree planting is encouraged in the colony schemes to provide for timber and fuel and thus to spare the cow-dung for manuring purpose. The trees increase the humidity in atmosphere thus tempering the hot dry climate of the South-west Punjab. The roads are lined by trees.

Colony Towns. The location and layout of colony towns have been done in close co-operation with the Railway, Public Health, Irrigation and Public Works Departments. The towns have been selected at intervals of at least 20 miles thus giving each town a radius of 10 to 14 miles. The pure water supply for drainage, suitability of soil in the neighbourhood for brick making have been kept in view.

The rectangular block system has been adopted (Montgomery, etc) All main thorough fares are straight and all open spaces in the town lie on one side on the main road. Road junctions with wells in the middle are avoided. Village roads from the villages to the railway stations do not pass through the main bazaars.

Every town and its area (12 miles radius) is self contained having mundis, factories, schools, and hospitals. Factories, are always outside the towns and mundis are always near the railway station. Local markets, vegetable, fruit and meat markets, are on main roads. Every town has a veterinary hospital with its slaughter houses nearby. Bathing tanks for men and women are situated in the public gardens on the out-skirts. A sarai is always provided near the railway station. Plots have been reserved for the religious buildings of various communities. Every town has an open space reserved for annual fairs. Like the village back to back houses are not allowed.

With the increase in population and development in commerce and industry most of the towns are losing their original plan and are growing in different sites in a haphazard manner.

The municipalities are slack in fulfilling their obligations and usually no attention is paid to ventilation and sanitation in badly managed towns.

Wheat and cotton are the two chief crops of the colonized area and their dominance has a marked influence in the lay-out and construction of towns. Towns like Lyallpur lying in wheat zones abound in grain elevators and flour mills. Cotton cultivation is responsible for the appearance of ginning factories and cotton presses.

The province of the Punjab to-day presents a picture of all-round development and economic prosperity. Besides being the largest producer of wheat in India it is also one of the largest producers in the world. The Salt Range contains the largest known deposits of salt in the world. It is also quite advanced in the matter of industries. The number of factories is about 800 employing about 70,000 workers. The total mileage of roads is about 26,000 miles including 5,600 miles of motorable metalled roads. There are about 7,000 miles of railways in the province. The mileage of navigable canals is good. Important towns are either (1) grain markets like Lyallpur (wheat), Multan (cotton). (2) industrial centres like Ludhiana, Amritsar and Ambala. (3) or railway or road centres like Lahore which is also the capital.

Note :—We have purposely not followed the usual scheme of natural regions given by different books as most of them have confused natural regions with Physical regions. Dudley Stamp gives 3 natural regions viz (1) The North-Western Dry Hill Region; (2) The Himalayan and Sub-Himalayan Region and (3) The Punjab Plains (a) N. E. Plain (b) South Central Plain (c) S. E. Plain. The census department has (1931) divided the province into 4 natural divisions based on physical and climatic features viz (1) Indo-Gangetic Plain West; (2) Himalayan (3) Sub-Himalayan and (4) North-West Dry area.

We believe that the agricultural zones described serve our purpose best.

SINDH

The province of Sindh occupies the entire natural region entitled the Lower Indus Valley. Like Orissa, Sindh was also created a new province in 1936, it formerly being a part of the Bombay Presidency. The province has an area of 48,136 sq. miles and a population of 4,535,008, out of which about 59 percent are engaged in agriculture and other industries and about 10 percent in industries most of which are cottage industries, the province being poor both in power resources and minerals. Physically it is a part of the great Indo-Gangetic Plains and is characterised by an Alluvial plain stretching from the edge of the Baluchistan Plateau on the west to the Thar desert on the east. The Indus which is the true life-giver in the absence of rainfall flows through the province. It is also the hottest region in India as "The Thermal Equator passes through Sindh and the Tropic of Cancer almost touches it."

A great deal of Sindh is essentially a flat desert having extremes of climate. Situated on the verge of both the monsoons, it gets rainfall only to the extent of much below 10". The soil, however, is such as can easily benefit from irrigation and is capable of producing good crops. It is, however, not so rich as the soil of the Ganges Delta. The water supplies in the Indus are varying being quite low during the eight months of the year and

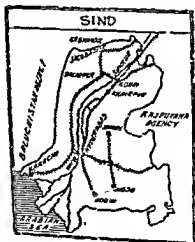


Fig. 74.

during this period only the old Faleli canals and the works at Sukkur and Jamrao can supply water to the adjoining lands. The Lloyed (Sukkur) Barrage was opened in 1932, about 80 per cent of the cultivated area is irrigated by the canals of this system. The barrage now provides perennial irrigation to more than two million acres and has brought about an extra three million acres under cultivation. The system boasts of 5,000 miles of main canal works and 700 miles of branches. The Rohri canal is 208 miles long and commands an area of 2,837,000 acres by means of 1,887 miles of distributaries and 20,246 miles of water courses. Seven canals, 3 on the right and 4 on the left have been dug. M. B. Pithawala gives a good account of the advantages of the Barrage which he calls "The EL Dorado of Sindh."

"Due to the flowing of the Barrage canals, enough water has been assured, irrigation has become perennial and the crops have surpassed the estimates for 1931-62 even within these 5 or 6 years. The cotton crops, for example, have increased from 3 lakhs acres in 1932 to 8 lakhs in 1935 and 9 lakhs in 1938. In the Khairpur State alone the Rabi cultivation has increased from the average pre-barrage yield of 83,846 acres to 1,33,927 acres in 1933-37, i.e., more than 100 per cent. Can anything better be expected? Side by side with this, effective research work as regards reclamation of Kalor lands, soil fertility, crop improvements, etc., is going on at Sakrand, Dotri, Mirpurkhas and other centres in the valley. Horticulture is another new line of development in Sind. Thus all round the agricultural wealth of Sind has increased on account of the Barrage."

The total area commanded by the Barrage in the British territory excluding the Khairpur State, which too is so greatly benefited by the two powerful feeders, is 7,406,000 acres; of this 5,042,000 acres are expected to be cultivated, as they are cultivable. As the area cultivated before the Barrage was only 2,037,000 acres, the increase in the very first year alone was 407,178 acres. The annual total crop of grain and cotton is approximately 2,000,000 tons. The results, on the whole, are very promising indeed. Even the population is getting re-mobilised in the Barrage Zone, on the same account.

That the Barrage is really a great boon to the people of the province can be proved very easily. A single instance will suffice. Usually a moderately deep well for irrigation purposes in a field of 5 acres costs Rs. 600, that is, one for one acre costs Rs. 120, over and above the lifting charges, while the water supplied perennially both for the Rabi and the Kharif seasons under the Barrage System costs Rs. 33 only per acre of holding. What a great saving of money and of anxiety besides! Those of the Zamindars or Khatedars, small or big, who are hard-working and who care to cultivate *their own fields*, are bound to make good profits by agriculture alone in future years.

Crops :—Land nilistation figures for Sindh in 1937-38 were :—

Area	30,179.5	thousand of acres.
Cultivable	10,013.7	"
Waste	19,448.1	"
Forests	717.7	"

One point to note is that the Indus delta, unlike the deltas of the Ganges, is useless and wild having some pastures.

The following table gives the percentage share of Individual crops :—

Millets	...	34
Rice	...	25
Wheat	...	12
Cotton	...	7
Oil Seeds	...	6
Other foods	...	9

It is natural to be assumed that crops specially those requiring large quantities of water get unimportant as we move away from the river and the canals.

Minerals. In the matter of actual mineral production Sindh is very poor. As a matter of fact no systematic geological survey has been made of the area and as such no definite information regarding the hidden wealth is available. The tertiary deposits of Kohistan are supposed to be rich in brown coal, iron, alum, gypsum and clays of various types. Salts abound in the salt beds and lakes. Prospecting in recent years claims that Sindh is a big potential oil field, specially at Drigh road. But nothing definite is known as yet. Abundant deposits of common salt have been discovered in the Indus Delta and it is reported that they could easily last for 40,000 years is at an allowance about 10 seers per head for year. Salt works are situate at Manupur. Industrially the province is very backward. It is just to show the great unimportance of industries that we give the following table showing the average daily employment in large industrial establishment in the province the number of which is the lowest possible :—

Textile	...	...	449
Minerals and Metals	...	...	66
Paper and Printing	...	...	516
Gins and presses	...	...	75

Fishing. Fishing as yet has attained no importance in the economy of the province although it is hinted that this industry could be very profitable. The Sindh coast contains good quantity as well as quality of fish. The Indus too could be profitably used for the same purpose. Pearl-fishing also holds out bright prospects. The native oyster is well known all over.

*15,419 persons are employed as seasonal labour.

Population. Sindh as a population of 4,535,005 out of which most of the people live in villages of which there are about 6,533 in the province. The number of towns is only 26, and except for Karachi, Sukkur and Hyderabad not many of them should really be called towns. Out of every 100 workers 60 are engaged in agriculture and animal husbandry and only 10 per cent in manufacturing industries most of which are of the cottage type. Most of the people live in places near the rivers or canals. A number of new settlements have come to be in the newly created colonies in the Barrage region only 15 per cent of which was unoccupied or uncultivable. Sindh, therefore, presented peculiar colonization difficulties. Most of the land commanded by the Barrage was privately owned and individually cultivated. Owner lands were only few and these were auctioned before the construction of the Barrage and the money thus realized was used in its construction. There, therefore, exists no uniformity in the layout of the settlements or in the size of holdings. The crown lands were sold out after rectaogulation. Land was first leased out only for 5 years after which period only the earnest goes were allowed to retain on some fixed payment.

Sindh is a Muslim majority province having 3,208,325 Muslim other communities claim :—

Hindus	...	...	1,038,292
Scheduled caste	...	...	191,634
Sikhs	...	...	31,011
Christians	...	...	20,209
Parais	...	...	3,838
Jews	...	...	1,092
Jains	...	...	3,687

Sindhi is the language of the province. This language bears affinity to Sanskrit, but it has worked influence of Persian and Arabic language and is also written in Persian Arabic script.

Sindh is very poor in the matter of inland transport specially railways and metalled roads. There is a small total of 11,732 miles of roads out of which only 263 mile. are metalled. In the matter of railways it is equally poor. "A shorter cut to Bombay of rail is another boon long looked for so that such other hinterlands as ports of Gujrat, Rajputana Kathiawar may also be opened out for Karachi." A mention has already been made of the importance of Karachi as a port and an air-base. It is also the capital of the province and the largest railway centre. Hyderabad and Sukkur are important inland towns situated on important railways.

UNITED PROVINCES

Extending eastwards from the Jumna and lying more or less in the centre of Northern India is the United Provinces. It has a total area of about 103,247 square miles excluding the Native States of Benares, Rampur and Tehri-Garwal (total 6,276 square miles). The total population amounts to 49,614,853.

Physically more than seventy-five per cent. of the province forms a part of the greater Indo-Gangetic plains.* In the north it also includes portions of the Himalayas and the sub-Himalayan tract. The southern portion lying south of the Jumna (later on the Ganges) is geologically lined with the hills and plateaus of central India—Bordelkhand. This rough area in the south represents the northward limits of the Vindhayan rocks. It is broken up by low, rocky spurs of the Vindhayan hills covered with stunted vegetation. Isolated patches of black cotton soil occur here and there.

The drainage of the province finally falls into the Ganges. The rivers play a very important part in the economy of the province.



Fig. 75.

Climate. The province lies entirely within the temperate zone but falls like the rest of North India within the tropical monsoon type of climate on account of the Himalayas that lie in the north of the region. The Himalayas completely divide the climatic conditions in Tibet that lies to their north and India that lies to their south. This change is both in temperature and rainfall, in making India

*This province like Punjab has been dealt with in detail

†Before 1917 it was called "the United Province of Agra and Oudh."

‡Nowhere higher than 600, except in the west near Saharanpur.

comparatively warmer and wetter than Tibet. The seasonal variations in climate are of importance because the activities of the agriculturist depend on them. The year can readily be divided into three distinct seasons, *viz.* Cold Season from October to March, Hot Season from March to June, and Rainy Season from June to October.

Cold Season. This comes after the rains, about the middle of September, and goes on to the end of March. The south-west monsoon that had given rainfall in the preceding months, dies down. In some years, especially when the south-east monsoon comes late in June, there are a few showers in October and this fact is rather beneficial to the *Rabi* (winter) crops, *e. g.* wheat, barley, etc. The temperatures decrease considerably and continue decreasing till January. The weather remains bright and clear, the days are not so cold except when there is a breeze, but nights get very cold, and sometimes in January the temperature falls considerably in the night. January is the coldest month of year, and the mean temperature comes down to 53°F. to 69°F. With the advent of February, temperature rises again and means come up to 58°F. to 69°F. The difference between the daily maximum and minimum is generally great. The winds that prevail during these months are generally north-west or west, and as they come from dry lands they have practically no moisture. These winter winds are generally very slow and their speed always averages between two and three miles an hour. Whatever small rainfall is received during this season is given by shallow land-storms that are believed to be moving eastwards from the Iran plateau and other local dust-storms. These dust-storms continue eastwards and sometimes go as far as Bengal. Temperature rises with their advance, sometimes by 20 to 30 degrees. Their origin and cause is still an undecided fact. Kendrew thinks that they resemble the cyclones of the westerlies and that they are the eastward continuation of the Southern European disturbances. If they originate in Iran Plateau, from whence, do they get the moisture, and why by the time they reach India are they not deprived of it by the series of mountains and of tablelands that they have to cross on their way to India? While on the other hand in summer the south-west monsoon that originates in the Bay of Bengal loses all its moisture by the time it reaches the North-west Frontier Province, and is practically without any moisture when it crosses (if at all) the Karakoram and Carpathians Mountains situated on the western frontier of India. Their origin is still to be enquired into by the meteorologists.

Hot Weather. By March the temperatures begin to rise rapidly and the mean comes up to 80°F. In April and May the temperature continues to rise when it reaches its maximum about 90°F. The maximums vary according to stations and

somewhere they rise as high as over 115°F . June is equally hot except for the later part of it when some rainfalls and temperature falls by two or three degrees fahrenheit. The winds are generally strong and westerly and sometimes accompanied by severe sand-storms that uproot trees and do considerable damage to buildings and cultivation alike. Precipitation hardly exceeds one inch and the storms mentioned above may be held responsible for it. This is the reason why the farmer prepares his fields for his summer crops and waits for the rain to sow his crops, but sometimes with the help of irrigation he sows crops earlier.

Rainy Season. There is a sudden change about the middle of June. The south-west monsoon sets in and the atmosphere gets cooler, but when the rains fall there is no wind and the atmosphere gets stuffy. Temperatures tends to lower down at all places. The Bay of Bengal branch of the south-west monsoon first goes through Bengal to Garo and Khasi Hills in Assam. It is then deflected eastwards and begins its journey into Bihar, U. P. and the Punjab. The presence of these hills in Assam is the most important factor in the matter of the rainfall of these provinces.

In our area the monsoon usually breaks towards the end of June. The probable date when it reaches Allahabad, may be said to be the 20th of June. There is not much difference between the time of its arrival at Allahabad and when it arrives at Agra or Meerut. The intervening period may be a week or less. We have to rely on conjectures on this point. The approximate dates when it arrives at different places in our region in a normal year have already been illustrated. The rain normally continues till the first week of October. During these months the greatest percentage of the total rainfall is received.

Rainfall decreases from the east to west. Allahabad gets 37.22 inches of rainfall every year while it gets less and less as we proceed towards Fatehpur (15.18 inches) Cawnpore (31.85 inches) and Agra (25.08 inches). It also decreases as we get away from the northern hills; Bareilly and Pilibhit get 44.48 inches and 49.05 inches respectively. Then there is a sudden decrease as we get away from the mountains, Shahjahanpur 37.38 inches and Budan 32.91 inches.

As a whole the rainfall conditions are very erratic. The rainfall is very unevenly distributed. Seasonal or general rainfall deficiencies are not unusual and have been responsible for many famines in the past.

From the agricultural point of view rainfall distribution throughout the year is more important than the total rainfall. The ideal rainfall distribution is a good fall in June when the farmer sows his summer crops, then a short break, moderate rain

in July, August and September and about two or three inches in the first week of October. This distribution enables the farmer to plough the rain-softened fields at the end of June and sow his summer crops, which generally comprise rice, maize, sugar, cane-cotton and certain pulses. These summer crops need no irrigation if there is distributed rainfall in July, August and September. An early cessation of rains or long breaks in the monsoon or overflowing of the fields by rainfall mean damage to the crops. The first two are more usual in our area and that damage to crops can now be mitigated by irrigation.

A good shower in October ensures a good sowing of the winter (rabi) crops which consist of wheat, barley, gram and pulses. These are sown in October and reaped in April. Timely rains at the end of December or early January are good for these crops. These crops generally need irrigation. Irrigation also helps the farmer to sow his sugarcane in March so that the fields may be ready for harvest in October when winter crops are grown. From the foregoing remarks it will be seen that without irrigation agriculture in the western districts is a gamble in rain.

The Ganges Jumna Doab has good irrigational facilities including wells, tube-wells and canals. Tanks are also in use in the southern districts. A detailed account of the irrigational works has already been given in the chapter on irrigation. Here only passing references are needed. About 15% of the total area cultivated is irrigated in the whole province, but the percentage in the west and in the districts of Shahjahanpur, Hardoi and Pilibhit is quite high as most of the works are situated in this area. In the matter of well irrigation U. P. stands highest with 11,33,442 wells irrigating about 53,03, "Ganges valley tube well scheme" is the most important scheme in India irrigating about 800,000 acres. The province also has good canal system. It boasts of 2,371 miles of main channels and 11,756 miles of distributaries irrigating about 3.9 million acres. There are three large canal systems and three smaller ones. In the lower category the Upper Ganges Canals and the Lower Ganges Canals are quite old, while the Sarda Canal is of quite a recent origin. The Bundelkhand canals, and the Agra and the East Jumna canals are smaller works.

Crops. Agriculture is the chief industry employing about 70 per cent of the people. The soils of the plains are very fertile. The rainfall is between 30" to 40" in the west and above 40" in the east. Bundelkhand is not so fertile and the rainfall too is quite low. The land utilization figures are :—

Total area ...	67,849,000	acres.
Cultivable ...	38,809,000	"
Waste ...	19,877,000	"
Forest ...	9,275,00	"

To this may be added figures for unproductive works.

Rice and sugarcane are very important in the eastern most districts while wheat, cotton and sugarcane are cultivated in western cultivated areas. Millets thrive well in the southern parts. The slopes of the mountains and the valleys also yield some hardy crops and tea. The following table give figures for individual crops:—

Rice	...	7.56	Million Acres.
Wheat	...	7.5	" "
Sugar cane	...	1.2	" "
Barley	...	3.7	" "
Millets	...	2.31	" "
Cotton	...	.8	" "

Minerals and Industries. U. P. is not important for mineral production. The chief minerals are coal in southern Mirzapur district and iron and copper ones in the Himalayan districts. Firestone, Gypsum and sand which are useful for glass manufacture are also available. Small quantities of gold are had by washing the sands of some of the rivers in the hills. Power is had from the Ganga Grid scheme. Only about 11 percent of the people are engaged in industries. In 1939-40 there were 548 factories employing a maximum of 159,733 workers. Sugar, textile, leather and glass are the chief industries of the province. There are 83 sugar mills, 3 woollen mills and 25 cotton mills. There are also some leather factories in Cawnpore and elsewhere. Saharanpur and Allahabad manufacture cigarettes. Lucknow has an important paper mill. Cawnpore is the chief industrial centre of the province and has the maximum number of textile (specially cotton) leather, oil and soap factories. It is also a very important railway junction and perhaps the largest trade centre.

U. P. is well served by roads, railways and river transport. It has some 30,770 miles of roads, 8,10 miles of which are metalled. The province also possesses the longest railway mileage in the country. There are 33 miles of railway to every 100 sq. miles of area. Nearly all the rivers are used for boat traffic. The Upper and the Lower Ganges canals are also navigable throughout.

Population. The total population of the provinces is 496,14,333. The density is highest in the plain districts especially in places of higher rainfall or good irrigational facilities as they leave a direct bearing on agriculture which naturally controls population. The great pressure on the soil is clearly evident from the following table.

District.	Density
Benares	930
Lucknow	Average for U.P. 442.
Jaunpur	" " Doab 457.
Meerut	" "
Muzaff.	" "

The increase in population has been marked in those places which have seen an increase in irrigated area. For example Benares and Jaunpore two new canal districts yielding 8.1 'rec. and 2.2 p.c. increase in 1881-1931. While Meerut and Bulandseher and Muzaffarnagar, which have seen great irrigational development have registered an increase of 24 per cent and 23 per cent and 19 per cent respectively.

The most striking factor in the distribution of population as that out of every 1,000 persons only 112 are urban and 288 are rural. This is quite in accordance with the general trend in the country where agriculture is the main occupation of the people.

The province is predominantly Hindu, about 83.27 per cent are Hindus and 15.2 per cent Muslims. Hindustani is the common language of the province. Urdu and Hindi are two literary languages. Lucknow and Allahabad share the provincial headquarters while Nainital is the summer capital. Other important towns include Cawnpore, Meerut, Benares, Hathras, Aligarh and Mirzapur. A mention regarding the importance of the towns has already been made.

Natural Regions. It is now possible to divide the province into natural regions. Dudley Stamp has given four main divisions. (1) The Himalayas Regions, (2) The Sub-Himalayan Region, (3) The upper Ganges valley, (4) The middle Ganges valley. Recent researches have, however, modified these regions. B. N. Mukerji divides the province agriculturally and takes into consideration relief, climate, irrigation crops and population. His divisions are:—

1. The Himalayan Region.
2. The Sub-Himalayan Region or the Siwaliks.
 - (a) The Siwalik proper including the doons.
 - (b) The Bhaters zone.
 - (c) The Terai.
3. The Gangetic Plain.
 - (a) Transition zone.
 - (b) Wheat zone.
 - (c) Rice zone.
4. The trans-Jumna Tract.
 - (a) Black soil belt.
 - (b) Red soil belt.
 - (c) The Gurdwara Belt.

*B. N. Mukerji, *Agricultural Regions of U. P.*, The Calcutta Geographical Review, Law 1942.

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District.	Density
Benares	... 930
Lucknow	... 814
Jaunpur	... 797
Meerut	... 699
Muzaffarnagar	... 541
Bijnor	... 466
Kheri	... 318

Average for U.P. 442.
Doab 457.

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*B. N. Mukerji, *Agricultural Regions of U. P.*, The Calcutta Geographical Review, Law 1942.

In a note Dr. Mukerji explains the basis of his division thus :—

The Himalaya and Siwalik's divisions are based on certain heights; Gangetic plain misolysed for the distribution of principal crops and the trans-Jumna tract on the rock and soil types.

Each sub-division of the Gangetic plain, viz. wheat transition and rice zones has been further sub-divided into smaller units based on the basis of irrigational types.

Mukerji's division is veterinary an improvement on the elementary division of Dudley Stamp. Below we give a summary of Mukerji's divisions.

The *Himalayan Region* comprises of the outer and the inner Himalayas down to an altitude of 5,000 feet contour lines. Some agriculture is carried on the lower slope which have been cleared for the purpose. The valley have attracted certain amount of settlement. The forest resources are vast but most of the forests await exploitation. Some Tea is also grown for export specially near about Dehra Dun. Not many people live here and the density decreases as height increases. The hill stations attract seasonal populations.

The *Sub-Himalayan region* includes the foothills of the Himalayas upto 5,000 feet. A narrower strip of plains lying just below the mountains is also included. This region is unhealthy and forested owing to heavy rainfall. The lower slopes of the Siwaliks are prosperous agricultural areas as the forests have been cleared. Wheat and tea are the chief crops. Irrigation water is available. The Bhalier presents a recent formations of boulders and gravel into which the streams get lost to reappear in Tarai situated southwards. The climate is damp and unhealthy. Population is mostly migratory. The Tarai is a land of marshes and fens. Southwards the Terai merges into the Gangetic Plain. Rainfall is heavy and vegetation consists of thick forests and tall grasses. Climate is unhealthy and malarious. More and more is now being reclaimed specially in the west where the true Terai has more or less disappeared. Rice, wheat, maize, and sugarcane are the chief crops. A few railway lines serve the area. Population is quite dense specially in the east.

The *Gangetic plain* measures about 500 miles in length and about 150 miles from north-west to south-east. The region is the transition area between the West Bengal and Bihar and arid Punjab. The doab is more akin to the Punjab, while Oudh resembles Bengal and Bihar more. Wheat cotton, and sugarcane and cotton predominate in the west and rice and sugarcane in the east. The doab also boasts of important canals and tube-well schemes. Most of the irrigation in the east is done by means of masonry wells. In between the wheat and the rice, zones may be observed a narrower area having characteristics of both, it being neither very dry nor very wet-transition zone.

The *Trans-Jumna Tract* includes the whole of Bundelkhand portions of Allahabad and Mirzapur districts lying south of the Ganges. Geographically and Geologically this area is quite different from the Gangetic plains and is more akin to the Central Indian uplands and plateaus. But the area slopes towards the Ganges in the north and as such it is included in the gangetic Basin. Bundhelkhand or the black soil region is the best part of the land, leaving a fairly good aystem of canal irrigation. Agriculture is followed. Dry zone crops are raised.

Red soil predominates in the southern portions of Jhansi, and Hamirpur districts and in portions of Mirzapur district. The soil being poor, agriculture is precarious. Only one crop can be raised in one year. Population is sparse. Most people live near rivers an agricultural lands.

The *Vindhayan Belt* includes the lower portions of Banda and Allahabad districts and the upper portion of Mirzapur. The region is a part of the Vindhayan plateau and the soil is poor and thin. Agriculture is very precarious. Some portions are forested.

Gondwana Rocks are found in the lower portions of Mirzapur district. Soils are poor and a big part of the area is bad. Grazing is the most important occupation. Some forests still exist. Many tribal settlements occur in the region. They follow some cottage industries. Communications are in a bad state.

Chief Commissioner's Provinces.*

1. *Ajmer Marwara* is an isolated British territory in Rajputana. Its total area is 2,400 square miles and its population is 5,84,000. It is covered with hills and is unsuitable for cultivation. Rainfall is low. Hardy crops are grown. Cotton is also grown with the help of irrigation.

2. *Delhi* along with its surrounding arsa was made separate province in 1912, when it was made the capital of India. It covers an area of 573 square miles and has a population of 636,245, out of which about 450,000 live in Delhi proper including New Delhi. Delhi is the most important railway junction in India where most of the important railways of India meet. It is also an important trade centre and has a number of mills of all descriptions, specially cotton, flour and sugar. It is surrounded by fertile lands.

3. *Coorg* is a small province to the South-West of Mysore. It has an area of 1,893 square miles and a population of 169,000. Its capital is Mercara. Agriculture is carried on, coffee are being the most important product.

*Baluchistan has already been described.

4. The *Andamans and Nicobar Islands*, are group of islands lying in the lower half of the Bay of Bengal. The Andamans consist of a number of islands big and small, and lie some 600 miles from the mouth of the Hoogly, but only 120 miles from Cape Negrais, Burma, the nearest point on the mainland. There are 205 islands in all (5 big and 200 small) and taken as a whole measure 219 miles in length and 32 in width; the total area being 2,508 square miles. Five larger ones are known as "The Great Andamans" and they adjoin each other closely, separated by four narrow straits. South of these are the Middle Andaman and the Little Andamans, roughly 26 by 16 miles, thus forming the southern extremity of the whole group.

The islands are known for their loneliness. Their coast is deeply indented and the coral beds are requisitely coloured. The bays are usually surrounded by huge mangrove swamps. The hills in the interior rise to about 2,000 feet in parts and are clothed with dense tropical vegetation. There are no rivers and few perennial streams but rainfall is sufficient and the tropical climate is tempered by pleasant sea breezes. The islands are rarely affected by a cyclone but they lie within the reach of every one that blows in the Bay of Bengal.

The islands possess considerable potential resources, although they have not yet been fully exploited although useful schemes are being chalked out for the economic development of the islands. There is plenty of fish in the surrounding seas and in normal times much turtle is exported to Calcutta. Some coconuts, hemp and rubber are also produced. There is also some good timber worked by Karens from Burma and also by convict labour. Sugar plantations have an excellent future.

The islands possess many good harbours of which Port Blair and Port Commallis deserve mention. Port Blair is also, capital. It is situated 780 miles from Calcutta, 740 miles from Madras and 360 miles from Rangoon. Most of the people here are ex-convicts or convicts. The natives are not many. The Nicobar islands are situated about 80 miles south of the Andamans. They have an area of 635 square miles and native population of 10,000.

INDIAN STATES

The Indian states comprise an area of 712,503 square miles and have a total population of 92,9730,000. This it will be seen that they represent 38·8 per cent of the area and 18·4 per cent of the population of the country. The states vary in size from Hyderabad measuring 82,000 square miles to the petty ones in Simla Hills and Rajputana measuring only a few square miles. It is well nigh impossible to write an account of all of them. In the following pages we describe only.

1. Kashmir, 2. Mysore, 3. Hyderabad, 4. Rajputana and (5) Central India agency and Gwalior in detail. The following table is quite informative.

<i>States and Agencies,</i>		<i>Area in 1,000 sq. miles.</i>	<i>Population in millions.</i>
Assam States	...	12·4	·75
Baluchistan States	...	79·5	·36
Bengal States	...	9·4	2·1
C. I.	...	52·0	7·5
Chattisgarh	...	37·7	4·0
Cochin*	...	1·5	7·4
Deccan (and Kohlapur)	...	10·9	2·8
Gujarat†	...	7·4	1·5
Gwalior	...	26·0	4·0
Hyderabad	...	82·23	16·3
Kashmir	...	82·8	4·0
Madras States	...	1·6	5
Mysore	...	29·5	7·3
N. W. F. P.	...	25·0	2·4
Orissa	...	18·2	3·0
Punjab	...	38·1	5·5
Punjab Hills	...	11·4	1·1
Rajputana	...	132·6	13·7
Sikkim	...	2·7	·12
Travancore	...	7·7	8·0
U. P.	...	1·8	·9
Western India	...	37·9	4·9

*Already described.

†J. L. Forster's "Island outposts of the Indian Ocean" (Illustrated Weekly of India—November 10, 1911) is rich article in the subject and we have drawn from it freely.

The Indian states are divided into many categories according to their size and importance. The British Government has fixed the number Salutes for various states. Various categories are A-21, B-19, C-17 D-15, E-13, F-11, G-9. Below we give names of states according to this classification,



Fig. 76.

Category A

Baroda ; Gwalior ; Hyderabad and Berar, Jammu and Kashmir ; Mysore.

Category B

Bhopal ; Indore ; Kalat ; Kolhapur ; Travancore Udaipur (Mewar).

Category C

Bahawalpur ; Bharatpur ; Bikaner ; Bundi ; Cochin ; Cutch ; Jaipur ; Jodhpur ; Kaurali ; Kotab ; Patiala ; Rewa ; Tonk.

Category D

Alwar ; Banswara ; Bhutan ; Datla ; Dewas (Senior Branch) ; Dewas (Junior Branch) ; Char ; Dholpur ; Dungarpur ; Idar ; Jaisalmer ; Khairpur Kishangarh ; Orchha ; Partabgarh ; Rampur ; Sikkim ; Sirohi.

Category E.

Benares; Bhavnagar; Cooch, Behar; Dharngadhra; Jaora;
Jhalawar; Jind; Junagadh; Kapurthala; Nabha; Nawanager;
Palanpur; Porbandar; Rajpipla; Ratlam; Tripura.

Category F.

Ajaigarh; Alirajpur; Baoni; Barwani; Bilaspur; Cambay;
Chamba; Charkhari; Chhatrapur; Chitral; Farikot; Gondia;
Janjira; Jhabna; Maler Kotia; Mandi; Manipur; Morvi; Nars-
singarh; Padma; Pudukkottat; Radhanpur; Raigarh; Sailana;
Samthar; Simur; Sitamau; Suket; Tehri (Garhwri); Wankaner.

Category G.

Balasino; Banganapatte; Bansda; Barundha; Bariya; Bhor;
Chhota Udepur; Danta; Dharampur; Dhori; Haipaw; Jawhar;
Kalabandi; Kengtung; Khilchipur; Limbdi; Loharn; Limawada;
Maibaa; Eayulbhanj; Mong Nai; Mndhol; Nagod; Palitana;
Patna; Rajkot; Sachin; Sangli; Sant; Savantvadi; Shahpura;
Sonpur; Wadhwan; Yawnghwe.

1. *Kashmir (and Jammu)* is in the north of the Punjab beyond the Salt Range. It has an area of 84,471 and a population of 3,945,000. It is an entirely mountainous region. Physically the state could be divided into some three parts (a) Upper Kashmir drained by the Indus and its tributaries; (b) Middle Kashmir drained by the Jhelum and Kishenganges rivers; and (c) Lower Kashmir comprising of a strip of low, level land along its southern borders. The Valley of Kashmir is a tectonic valley and is intermount from all sides, situated at a height of 5,000 feet. The origin of this valley like the valleys of Katmandi is attributed to the silting up of some



Fig. 77.

big lakes. The Wuller lake and the Dals near Srinagar are reported to be remnants of those bigger water bodies. The Jhelum that flows through this valley is navigable here. As a whole the region

is dry and the temperatures are usually low. At Sri Nagar the January temperature is 31 degrees F in July it is 73 degrees F. The rainfall is heaviest during January-April and it is about 14 inches. Most of the winter precipitation is in the form of snow. There are extensive forests rich in timber. Chief crops of the state include rice, maize, wheat, oilseeds, saffron, fruits, barley and tobacco. Mineral resources, though meagre, include coal, bauxite, fuller, earth zinc, copper, precious stone, and gold and lead. Not much is known, however, about the mineral wealth of the state. The silk filature in Srinagar is the largest in the world. The people follow a number of cottage industries, the products of which are famous all over. The railway mileage is very small in the state. Motorable roads are also not many, although the Jhelum Valley Road (108 miles) is supposed to be one of the finest motorable roads in the world. Srinagar is the chief town and the Capital. Golmurg, Jammu and Pahalagam are other cities. The Jammu Hydro-electric Installation on the Raobir canal of the Chenab river is deserving attention. The Jhelum Power Installation and the Muzaffargarh Hydro station also deserve attention.

2. *Mysore** with an area of 29,320 square miles and a population of 7,328,896 represents a rocky triangle situated in the south of the South Indian Tablelands at a place where the eastern and western ghats converge towards the Nilgiri hills. The average altitude of Mysore is 2,000 feet, representing perhaps the highest area in the plateau named the Deccan. "Mysore may be cited as an example of the plateau of erosion. The prolonged denudation, that the state has been subjected to, has left only the remnants of the former schists which in all probability were once much more extensive than they are now. The effect of weathering has been to emphasise the original irregularities in surface features and many of the chains of hills are composed of hard work, while the comparatively softer rocks have been worn away. Many rivers have carved out broad valleys. Cauvery is the most important river; others include its tributaries and also the tributaries of the Kistna and Pennar.

The region lies entirely in the rain-shadow of the Western ghats and naturally rainfall here is quite low, nowhere more than 40 inches this figure however represents the highest, there are places that receive even less than 30" or even 20". The heaviest rainfall takes place in a strip along the west, irrigation therefore, is a necessity as the rainfall besides being lower is also irregular. Tanks are generally used for storing water canals and wells are not possible to build owing to the rough topography. Temperature extreme on the whole a bit higher than in the plains but climate tends to be exempted.

*For a fuller account of the geology of the Mysore plateau refer to the topography of Mysore by C. S. Bachmatta. The Calcutta Geographical Review, January, 1944.

Agriculture is the main occupation employing about 75 per cent of the people. Millets, rice, grain and sugarcane are the chief crops. Cotton and groundnuts are also cultivated. Sericulture is followed as a subsidiary industry by the farmers. Area under mulberry in 1944 was 75 thousand acres and this shows a tremendous increase over the previous figures. The industry has bright prospects. Cattle breeding and dairy farming are also very developed, veterinary arrangements being very good.

The state is not very rich in minerals. Gold is mined at Kolar, the annual output being about half a million ounces. Manganese ore and chromite are also mined. Coal and petroleum are both unknown in the state and as such charcoal is greatly used for industrial purposes. Bharmati iron and steel works make use of charcoal from the neighbouring forests. Hydro-Electric power is quite developed as already stated. Silk and iron and steel are the two major industries of the state. Lac industry is also quite important.

The population is not very dense, average density being about 150 persons per square mile. More people live in the fertile valleys in irrigated tracts. The population consists mostly of Hindus speaking Kanarese. Mysore, the capital and Bangalore, the famous hill station are the two most important towns of the state. The Mysore Railway has a total mileage of over 700 miles.

9. *Hyderabad* is situated just to the north of Mysore. With an area of 100,365 square miles and a population of 19,194,313, it is the largest Indian state in the country. Berar is also a part of Hyderabad but it is administered by the C. P. Government. The whole state lies in rough lands, the Eastern half being a part of the black cotton-soil-region, Godawari in the north and Krishna in the south drain the region. Large quantities of cotton and millets are grown in the western region while the eastern is not so fertile. Generally speaking the temperature is higher than in Mysore but there are places which experience quite low temperatures specially in winter. The climate is inclined towards the extreme type. Rainfall is on the whole quite uncertain. North eastern part gets between 30 inches to 40 inches.

Agriculture is the chief occupation of the people. Rice and millets are the chief food crops. Rice is grown only in places of higher rainfall or where good facilities for irrigation exist. Tank irrigation is important in the state. The Osman Sagar and the Nizam Sagar is the biggest in India. Cotton is the chief fibre and crop and occupies an area of about 3 million acres specially in the black cotton-soil region. Oilseeds are also quite important.

Hyderabad has some coal mines, the most southerly of the Indian coal mines. The chief fields are situated in Sastri, Sungarani

and Paoani. The total production is 12,81,566 tons. Limestone and mica are other important minerals. Marble is found at Warrangal. Cotton manufacturing is the chief industry of the state; local cotton is used. There are also some cigarette factories and a number of button manufacturing institutions. Cement is manufactured at Shabbad from the limestone minea nearby. A paper mill has also been established at Kothapetta. The Nizam's State Railway has a mileage of 1,359 miles (mostly narrow gauge) In the matter of roads too, Hyderabad is not behind. It has about 4,000 miles of motorable roads. The state has its own motor service in Hyderabad proper and in some other districts. Hyderabad, the capital is also the most important railway centre. It also boasts of a number of industries specially cotton, soap and cigarettes. Secindrabad is the suburb of Hyderabad, Aurangabad and Warangal are also important towns serving their respective regions. They are also important railway centres.

4. *Rajputana* is the name given to a big area measuring about 135,091 square miles and occupying the dry, desert lands surrounded by U. P. in the east, Punjab in the north and Sindh in the west. The Thar desert has its largest share in Rajputana. Politically it consists of a number of Indian States and the British territory of Ajmer-Merwar (already described.) The region consists of the northern lowland and a southern region of rough topography the Rajput Uplands (constituting Satpura hills, the valleys of Eastern Rajputana, the Miwa plateau and the northern slopes of the Vindhaya hills and portions of the Narbada Valley).

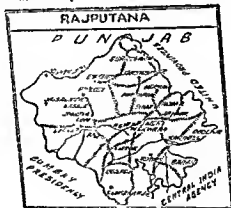


Fig. 78.

RAJPUTANA

The Arawali hills intersect the country from one end to the other (from south-west to the north-east). The area is sandy ill-watered and unproductive but things improve as one goes to the South-West with great supplies of rain and irrigation works. In the south part lies an area of higher rainfall and fertile lands traversed by many rivers. The temperature conditions are of the same type. But the diurnal and seasonal ranges of temperature are very high. In the Rajput uplands conditions are bit better and some areas are also better and inhabited by Bhils and other tribes. Millets and other hardy crops are the chief crops of the regions, wheat and barley and even cotton occupy some area. Some facilities for irrigation exist.

In the matter of power resources and minerals the region is very poor indeed. And naturally the state of industrial development is equally low. Some cottage industries specially carpet making are followed specially in Baikaner. Wooden toys are made at Jodhpur, and marble and stone goods are well known at Jaipur and some other places. Blankets are also made at many places.

In the matter of communication Rajputana is still quite backward. The eastern half is the most developed in this respect. The mileage of metalled roads and broad-gauge is small. The total length of railways is 3,259 miles, out of which some 2,003 miles belong to the native states, specially Jodhpur, Baikaner, and Marwar.

The important cities are mostly the capitals of states of the same name. In Mount Abu, a small hill station lives the resident for Rajputana.

5. The Central India Agency and Gwalior:— The Central India Agency and Gwalior are now separate—since 1921—the former under the Resident for Central India stationed at Indore and the latter having its own resident. The Agency comprises of the following treaty states and 61 other minor states.

Name.	Area in square miles.	Population in 1941
Indore	9,902	15,13,968
Bhopal	6,924	9,95,745
Rewa	13,000	18,20,445
Orchha	2,080	3,63,405
Datia	912	1,74,072
Dhar	1,800	2,53,210
Dewas, Senior Branch	449	89,479
Dewas, Junior Branch	419	83,669
Sambar	178	38,279
Jaora	602	1,16,953

The agency is an irregularly formed area divided into, (a) the Western half comprising of Bhopal and Malwa Agencies and (b) the Eastern or Bundelkhand agency, by a portion of U.P. (consisting of Jhansi district), Sangor and Gwalior state of which the Malwa Division is a part of this region.



Fig. 79.

The western half is a part of the Malwa plateau and is composed of old, hard crystalline rocks. At places we also come across traces of lava. The climate is on the whole pleasant. Rainfall is about 40", lower in some places. It gets lower in north-west and the area gradually merges into the Thar Desert. Owing to the rough topography, irrigation is difficult. Dry, hardy crop like millet predominate. Some wheat and cotton are also grown in irrigated tracts. Indor, the capital of the Indore State, is the chief town and is famous for its cloth mills. Bhopal is also important and is gradually growing. Ujjain, the chief town of the Malwa division of the Gwalior State is also famous for its cotton mills.

The eastern half or the Bundelkhand agency is a part of the natural region called the Central India Foreland. The area is a part of an irregular plateau and receives higher rainfall, about 45" and above. Rice is the chief crop, canal irrigation on a small scale is carried on. Industrially the area is very unimportant.

Gwalior which was upto 1921 a part of the C. I. agency is situated in the west of United Province and south of Delhi. It has an area of 24,367 square miles and a population of 3,992,000. Politically as well as geographically, it has two sub-divisions (1)

half which is partly a part of Bundelkhand and partly of Gangetic plain and (2) Malwa which is a part of the Rajput has already been described. The states boasts of many industries including cotton, leather, pottery and carpets. It has its own light railway. Gwalior, the capital is a good air centre with Manho Sagar as the sea-plane base and an aerodrome at Maharajpur.

SIKKIM*

Sikkim is a very small state about 100 miles long and 50 miles wide. The whole area is drained by the Teesta and its tributaries. In this small state, there are packed some of the highest mountains in the world. Sikkim shows the greatest confusion of high peaks and deep-cut valleys. Although the country is only a day's journey from Calcutta, some parts of it are inaccessible and some sections are still inaccurately mapped. From 1925 onwards there have been a number of expeditions in Sikkim, most of them in the Zemu valley. The valleys of Sikkim and the trade routes are well-known.

Sikkim is unique in its climate. It has the largest variety of climates in the smallest space. As Sikkim is outside the reach of the N. E. monsoons, it gets only the S. W. The monsoon sweeps into the valley of the Teesta and the lower foothills are extremely wet. As one gets further north up the Teesta valley, one gets into country similar to the dry Tibetan plateau. The range of altitudes in the country is also extreme, from 2,000 ft. to 28,000 (tropical heat to arctic conditions.) So the combination of wet and dry and hot and cold make it possible to find almost any climate, somewhere in Sikkim. In the deep valleys which are 2,000 to 3,000 feet the rainfall is as much as 200" a year; in the northern parts it is probably not more than 20" and just over the passes in Tibet, it is still less. In the low valleys there is very wet heat, Sikkim is of course well outside the tropics, but as it is also well inside the great land mass of Asia, in the low parts the weather is very hot. At the other extreme are found arctic conditions above an elevation of about 17,000 ft. Large areas of the state are under snow. These glaciers are very large in extent. Though they are not so big as those in the Karakoram which are the largest in the world, they are still very extensive, the best known perhaps being the famous Zemu glacier on the slopes of Kichenjunga.

Political relations with Tibet are very close, in fact closer than with India. The Raja is of Tibetan family and there is close contact between him and the Lhasa. The Raja rules with the help of a British Resident, but he is almost entirely responsible for the internal affairs of the state. The Government of such a small place with only 60,000 inhabitants has rather a 'comic opera flavour.'

The people of Sikkim are very mixed. There are a number of aboriginals called Lepchas. They are forest people, able only to find a poor living. But a more vigorous people have come in from neighbouring Nepal, usually known to us as Gurkhas. These people, easily distinguishable by their short stature and broad Mongoloid faces, have driven the aborigines from the lower valleys

*We have freely drawn from 'Sikkim', Indian Geographical Journal—January-March 1944.

into the northern and more inaccessible places. They have cleared stretches of forest. By means of terracing with great labour, the Nepalis grow their rice in tiny patches of ground irrigated by hill streams, and plant barley and wheat in the high valleys. The Nepalis live in a bracing climate and are active and cheerful. Besides, the Nepalis there are also Bengalis from the plains and many Tibetans. In fact, the majority of those one sees on the tracks in the north, are Tibetans trading from place to place.

Sikkim is mountainous and one could hardly look for much in the way of economic development. The country has not been exhaustively surveyed geologically but so far as is known no minerals of any importance have yet been developed. So the small population depend on agriculture and transport traffic. It might be possible to extend the agriculture to grow tea, rubber, cinchona or cardamoms. Tea gardens which cover the Darjeeling district stop abruptly at the dividing line between British India and Sikkim. However, there really isn't a lot of scope for such crops and actually the people in the lower valleys cultivate only rice and maize and in the higher valleys wheat and barley. Recently the growing of potatoes and apples has become important in the very high valleys where so far the rearing of sheep and yaks was the only industry. The latter are of great use as beasts of burden, source of milk for food and of hair which is woven into clothing, ropes and tents. Indeed the yak, is of first rate economic importance in the high Himalayas. Clothing is chiefly made from wool of the mountain sheep. Where the cold is intense, people wear the whole sheepskins.

Besides agriculture, the only other industry of Sikkim is transport. There are several routes into Tibet but they are all difficult. Through Sikkim lies one of the easier routes into Tibet and the former country is the main channel through which this trade goes on. Even here, there are only mule tracks and the passes are from 14,000 ft. to 16,000 ft. There is only one cart road in the state about 30 miles long from British India to the capital, Gangtok; all the rest are mule or footpaths. Some attempt is now being made to improve the road to Gangtok and thence to Lhasa, the capital of Tibet. It is hoped, to provide a route via Gangtok, and Lhasa to China. It seems rather a far fetched idea, since all transport after Gangtok would be by mule but those in authority evidently think it practicable. The population of Sikkim in 1941 was 121,000.

BUTAN.

To the east of Sikkim is Bhutan which is identical to the former in its physical, cultural and political aspects. It receives a subsidy of one lakh from the Indian Government and the same guides its foreign policy. Bhutan has an area of about 18,000 sq. miles. Punaka is the capital of the state. Rice, maize, millets and silk are the chief products. Forests yield good timber besides many other products like gum and resins. Musk, elephants and ponies are also important. The people are Mongolian, nominally Buddhists.

THE END

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